THE HANALEI PLANTATION RESORT DEVELOPMENT
GREEN DESIGN GUIDELINES FOR THE HANALEI RIVER RIDGE

by Nathaniel A. Mallari
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May 2014

Masters project submitted in partial fulfillment of the requirements for the Master of Environmental Management degree in the Nicholas School of the Environment of Duke University 2014

Abstract

The Hanalei Plantation Resort Development:
Green Design Guidelines for the Hanalei River Ridge

Ohana Hanalei, LLC, a real estate developer, is proposing to develop a hotel and residential project, the Hanalei Plantation Resort, in Hanalei, Hawaii on the island of Kauai. The proposed project would incorporate the restoration and enhancement of the Pu'u Poa Marsh, a public lookout pavilion, public parking and activity pavilions along the Hanalei River.

Deeply instilled in Hawaiian culture is an appreciation of land and the environment. New real estate developments have been extensively blamed for the deterioration of their ecosystems. Members of the community-based organization, Save Hanalei River Ridge, have testified against the proposed project, citing that the application for the land consolidation was incomplete and inaccurate. The organization argued that the Ohana Hanalei development project would ruin the green belt around Hanalei and the community's ability to utilize the natural resources as they exist today.

The purpose of this document is to analyze the current proposed development and determine if the design meets the criteria set forth by the Ohana Hanalei, LLC development team, County of Kauai and local community groups. The end result is a set of architectural design guidelines, specifically related to water quality and site preservation. Several recommendations are provided to the Ohana Hanalei, LLC development that are environmentally sensitive to the existing ecosystem of the Hanalei River Ridge and compliant with standards being sought by the Save Hanalei River Ridge community group.

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Photo Credit: http://www.hawaii-property.com/

Photo Credit: Kauai, North Shore Devlopment Plan

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INTRODUCTION

1.1 Project Background

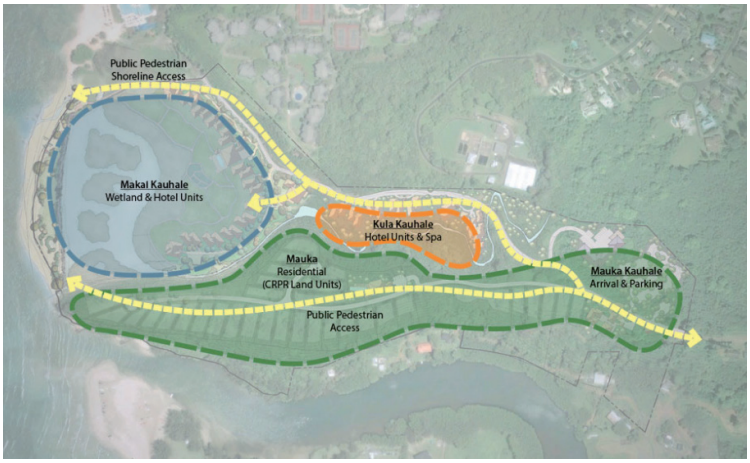

Photo Credit: http://hanaleiplantation.com/hpr/overall-master-plan/

Anticipated to commence in the next two to three years, Ohana Hanalei, LLC is proposing to develop a hotel and residential project in Hanalei, Hawaii on the island of Kauai ("Project Summary", 2012.) The project is located directly north of the Hanalei River and northeast of the Hanalei Bay. Accessible via existing infrastructure, the proposed Hanalei Plantation Resort project consist of 120 vacation units, which would include 34 Condominium Property Regime (CPR) land units for single-family homes as well as a homeowners association building. In addition, a low-density hotel development which would consist of 86 cottage units, a restaurant, spa and pool area. Further project features would incorporate the restoration and enhancement of the Pu'u Poa Marsh, a public lookout pavilion, public parking and activity pavilions along the Hanalei River.

The Hanalei Plantation Resort project plans to restore the Pu'u Poa Marsh to improve the wetland ecosystem as well as preserve the archaeologically significant rock wall along the ocean bordering the marsh. Improvements would consist of the removal of non-native species, invasive species, associated inlets and outlets to improve water quality, realignment of the Wailei'a Stream (closer to its original position) and the restoration of the wetland flora and fauna habitat. The developers hope that the restoration of the wetland ecosystem will provide opportunities for education, native cultural practices, as well as, management of the overall wetland community.

The proposed 34 CPR land units ranging from 15,000 to 18,000 square feet will be located on the southern portion of the project along the upper slopes of the Hanalei Ridge. Immediately upon property purchase, the land owners will have full control over design, construction and landscaping. However, the designs must be compliant with the set of the established design guidelines.

In order for the project to move forward, two large lots which house the project site were purchased by the Kauai Planning Commission and approved for consolidated in February of 2013. Members of the community based organization, Save Hanalei River Ridge, testified against the consolidation, citing that the application for the land consolidation was incomplete and inaccurate (Azambuja, 2013.) The organization argued that the Ohana

Hanalei development project would ruin the green belt around Hanalei and the community's ability to utilize the natural resources as they exist today. One individual stated that the county should be "using every means at its disposal to protect his land, as inappropriate development would destroy one of Kauai's most critical view planes". Those opposing the project fear that it will resemble the bluff overlooking Nawiliwili Bay in Lihue, which is widely criticized and will set a dangerous precedent for future developments on the other ridges surrounding the bay. The developers defend their design by ensuring their current plan is both culturally and environmentally sensitive, while implementing appropriate measures to prevent such apprehension.

1.2 Purpose and Intent

The purpose of this document is to create a set of design guidelines, specifically related to water quality and site preservation. These guidelines provide several recommendations for the Ohana Hanalei, LLC development that are environmentally sensitive to the existing ecosystem of the Hanalei River Ridge. Furthermore, the design guidelines are compliant with standards being sought by the Save Hanalei River Ridge community group.

Deeply instilled in Hawaiian culture is an appreciation of land and the environment. Particularly, new developments have been extensively blamed for the deterioration of our ecosystems. The design guidelines for Hanalei River Ridge seek to establish a balance that would ensure the preservation of the land and surrounding ecosystem, while establishing a model for environmentally sensitive coastal development.

Therefore, these design guidelines are intended to serve the following functions:

- Establish a set of Best Management Practices (BMPs) and innovative techniques concerning water quality and green infrastructure
- Establish a site layout that would adhere to the requests of the local community groups
- Establish a set of design guidelines that would minimize the visual impact on the surrounding community

1.3 Environmental Issues

Hawaii is one of the most isolated groups of islands in the world. Across the globe there has been difficulty in drawing the line separating human access and natural resources. As population continues to grow and development continues to expand, a common issue remains whether development and natural ecosystems are able to coexist. Explicitly, in Hawaii where available land is finite, such issues are especially prevalent.

Hawaii suffers from a lack of available and affordable housing. Since Hawaii became a state in 1959 the population has more than doubled with over 1.3 million people calling Hawaii home in 2011 (Honolulu Civil Beat, 2013.) In addition to the steady growth in population there are approximately seven million visitors to the Hawaiian Islands annually. Although landmass has remained static throughout the years, the human demands for land are ever growing resulting in adverse impacts on the existing ecosystems (Honolulu Civil Beat, 2013.) Furthermore, human expansion and new technologies have added new pressures to the Hawaiian ecosystem.

As a result, the State of Hawaii has made various efforts to reduce the effects of development on the environment through land use practices and regulation; however, a balance between environmental conservation and economic development still remains a current issue.

1.4 Project Location

The Hanalei Plantation Resort Development is located on the North Shore of Kauai, Hawaii on an approximate 65.5 acre site. The project site, consisting of Tax Map Key (TMK) [4] 5-4-004:001, 006 and 013 (see Figure 1.1) sits on the southernmost portion of Princeville north of the Hanalei River. The regional map (see Figure 1.2) identifies the major roadways, zoning boundaries and major bodies of the water in the vicinity of the project. The project site is identified by both the Kauai North Shore Development Plan and the Kauai General Plan as part of Princeville Visitor District Area (VDA). Access to the site is served by Hanalei Plantation Road, which can be accessed via the Kuhio Highway, as well as Lei O Papa road, part of the Princeville roadway system.

These design guidelines will be addressing an area of the site, known as the Kaukaniunu Ridge, where the 34 CPR units will be located (see Figure 1.3), which for the purposes of this document will be referred to as the Hanalei River Ridge. The Hanalei River Ridge is located directly north of the Hanalei River and overlooks the Hanalei River, Hanalei Bay, Pu'u Poa Marsh, the St. Regis Hotel, and the Hanalei Bay Resort.

1.5 Regional Setting

The North Shore Planning District of Kauai extends east to west from Moloa'a Bay to Punaiea Point (see Figure 1.4.) The North Shore is comprised of several communities which include, Ha'ena, Wainiha, Hanalei, 'Anini, Kalihwai, Lilauea and Princeville. Known for an abundance of natural resources, scenic resources, and outdoor recreation opportunities the North Shore of Kauai has become a major destination for visitors. Over the past 30 years, population rates

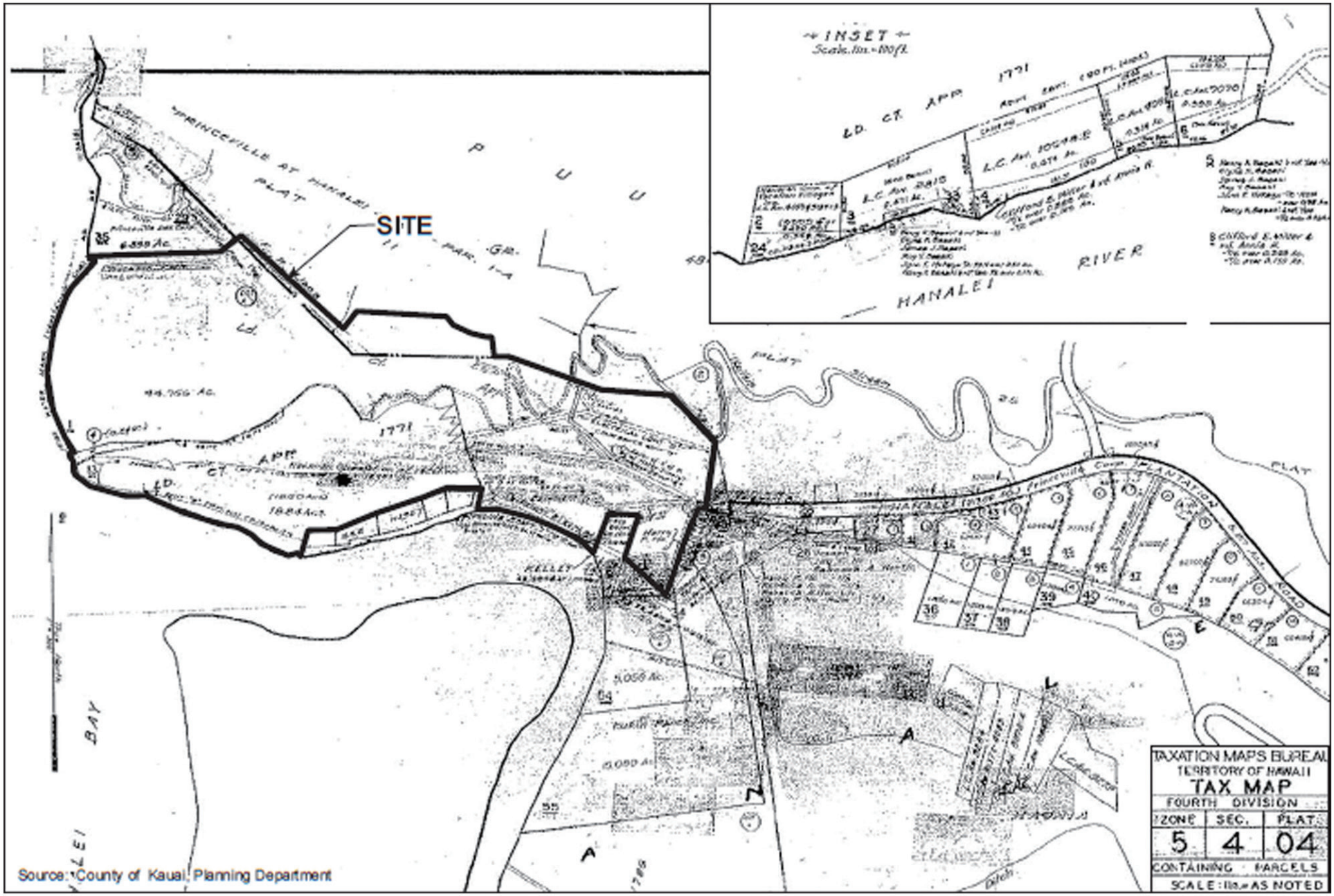

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Figure 1.1
TMK Map

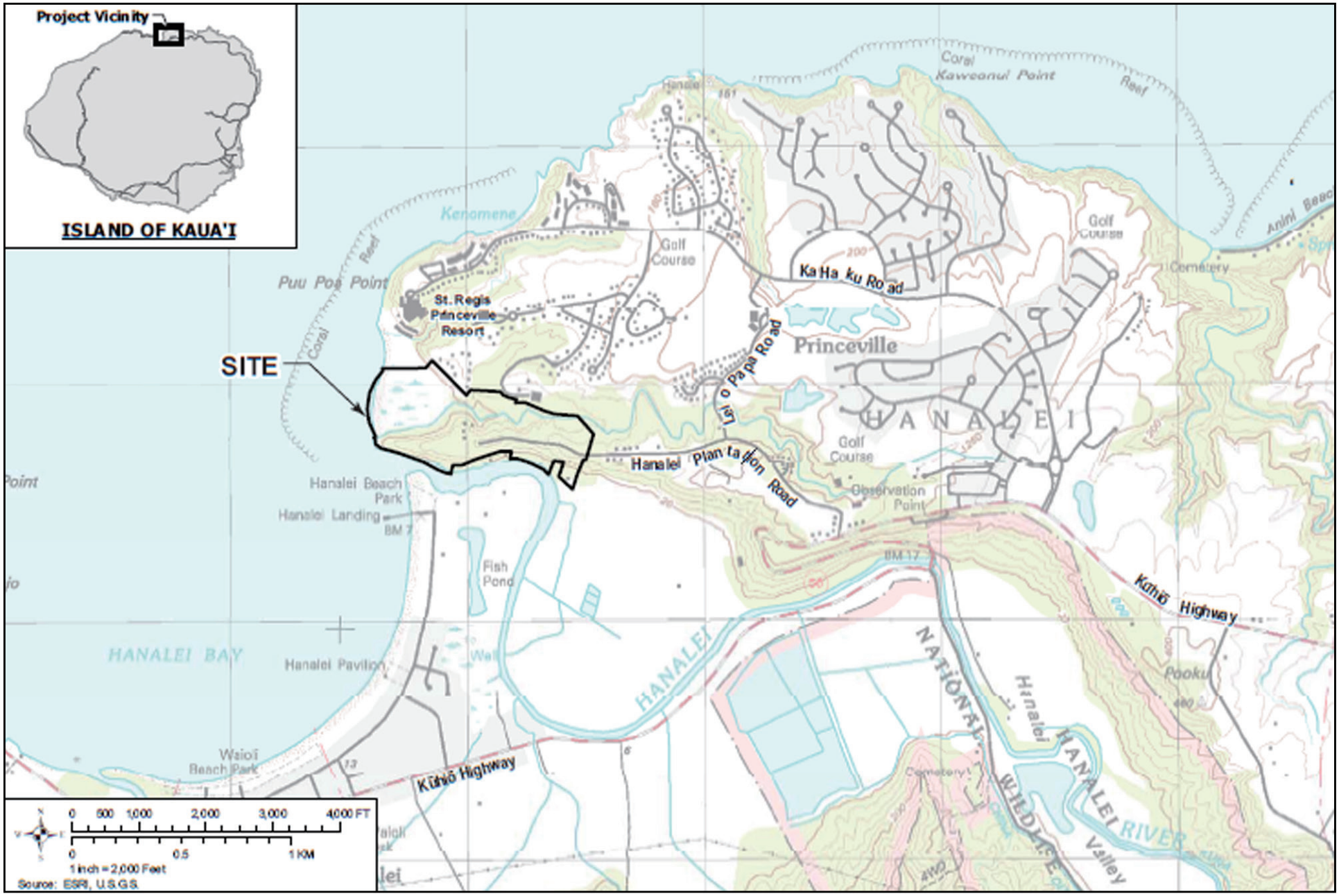

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Figure 1.2
Regional Map

Photo Credit: EISPN, The Hanallei Plantation Resort, 2013

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Figure 1.3
Development Summary

Photo Credit: EISPN, The Hanallei Plantation Resort, 2013

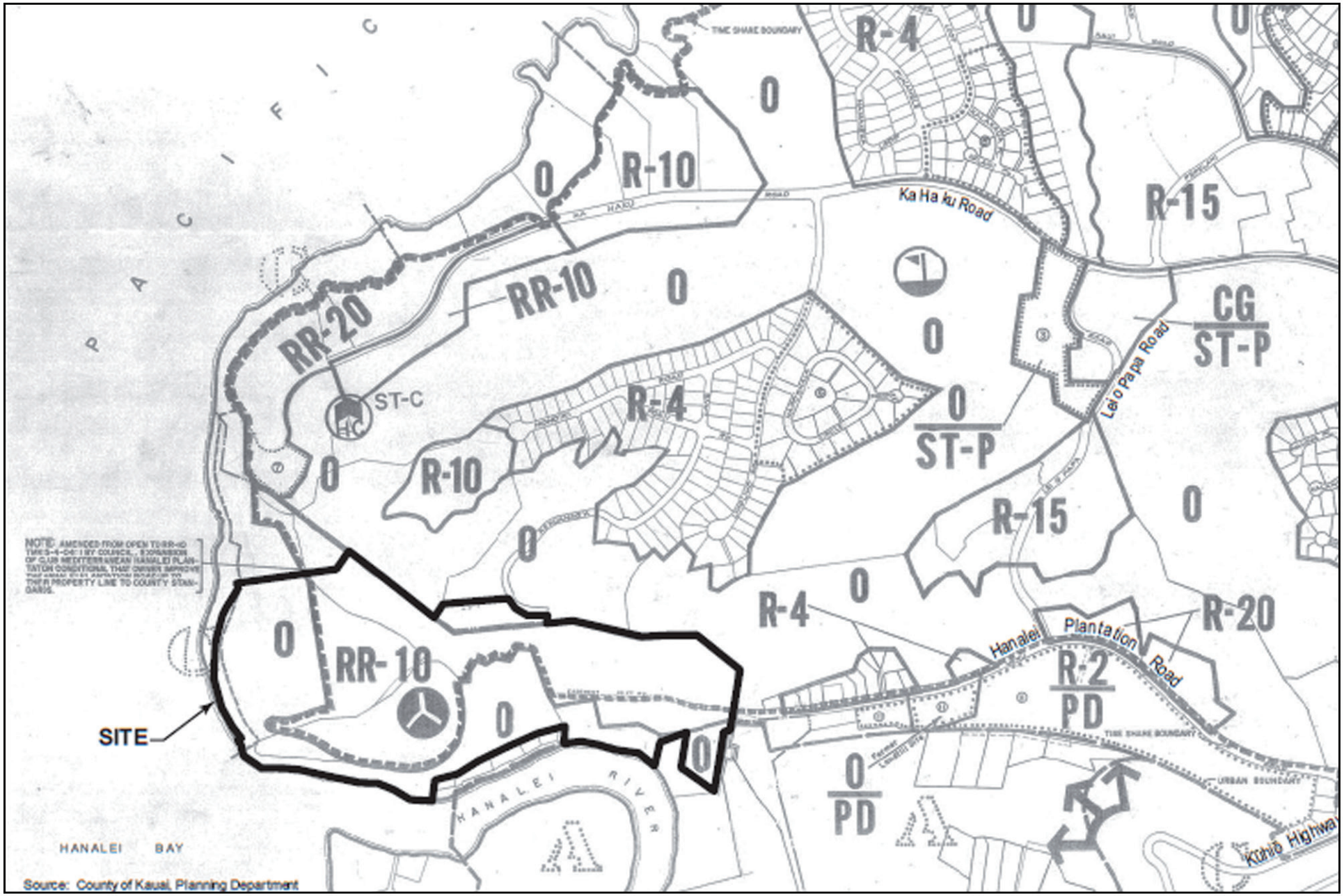

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Figure 1.4
North Shore Zoning

Photo Credit: EISPN, The Hanallei Plantation Resort, 2013

have been growing immensely on the North Shore, the population has seen a six percent increase and continues to grow (County of Kaua'i, 2012.)

During the General Plan Update process from 1998 to 1999, North Shore residents identified the assets of their community.

The following assets were primarily centered on the physical environment:

- Natural beauty of the North Shore
- Rural scenes
- Small town, rural, intimate environment
- Hawaiian culture
- Clean watersheds, rivers, and waterfalls
- Recreational opportunities – beaches, oceans and mountains
- Historic one-lane bridges from Hanalei to Ha'ena

1.6 Case Study Analysis

The following case studies were analyzed to gain an understanding of the challenges of green development in Hawaii, strategies currently being implemented, and the socioeconomic ramifications of green development. Aspects of the green development that were observed included local recycled materials, green technologies suitable to Hawaii and the acceptance of green development by local communities.

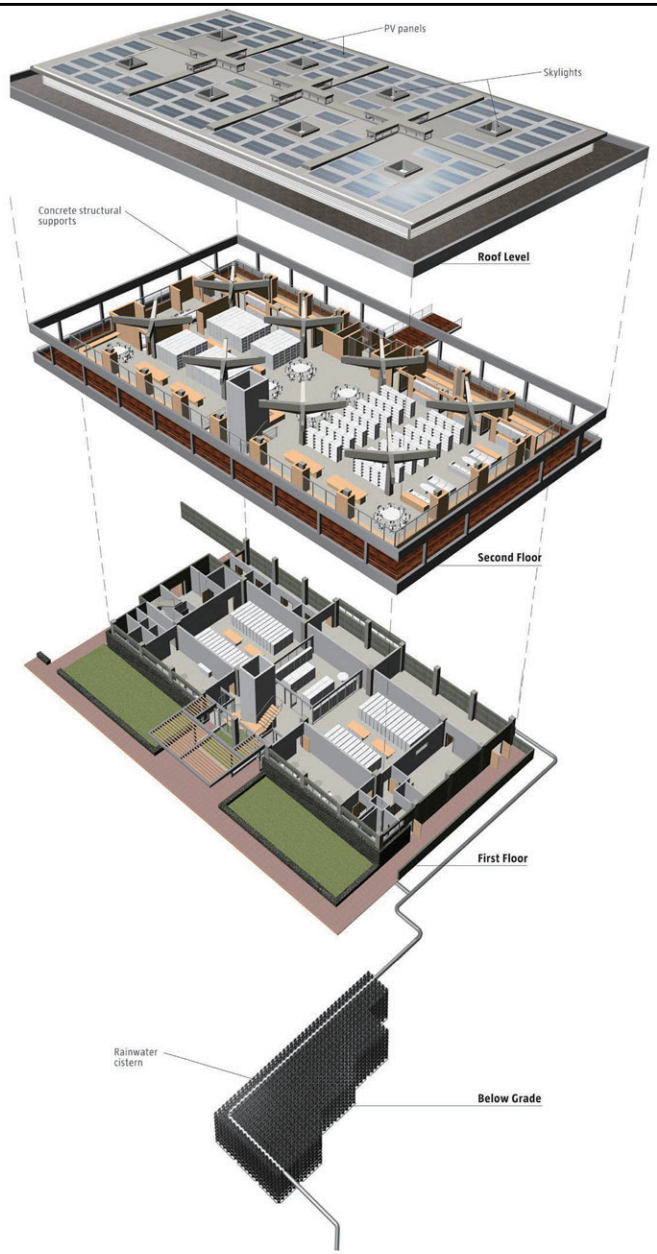
The Juliet Rice Wichman Botanical Research Center

"Growing up in the Islands at a time of immense development and changes in the built environment, I became of aware of Ossipoff's quest to match architecture to its specific place. Marrying the modern and the primordial, and tropical with a minimalist sensibility, his work resonated with my own aesthetic response to design problems – an approach informed by a process of simplification and the notion of shibui – given over to a higher order."

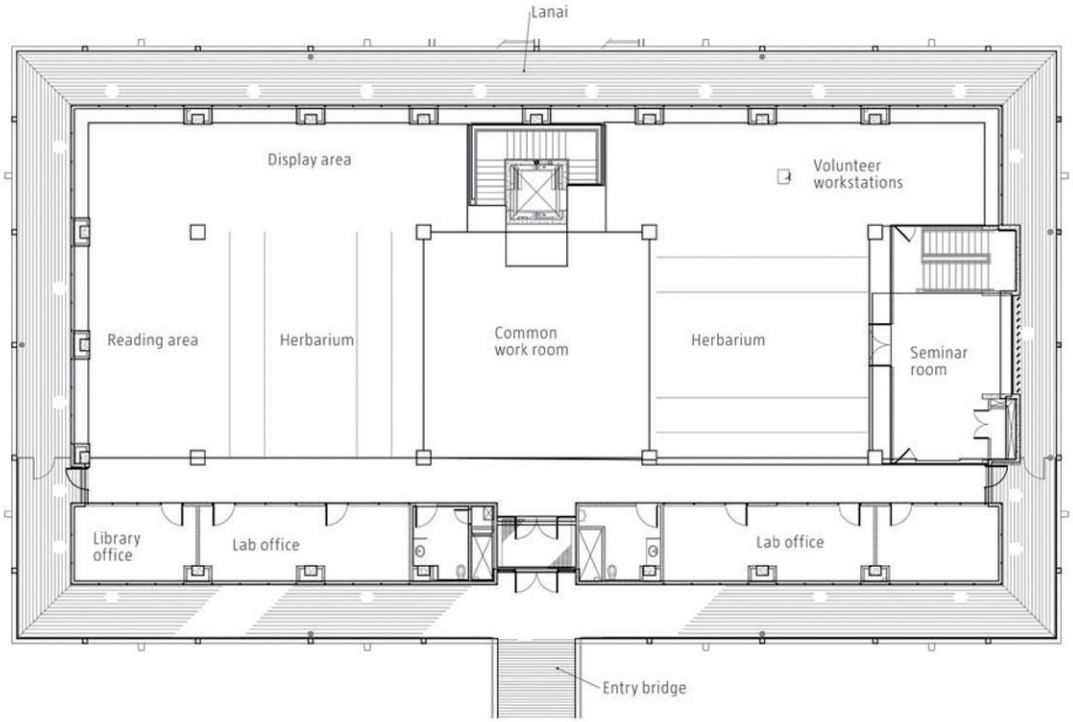
– Architect Dean Sakamoto

Photo Credit: http://www.architecturemagazine.com

In 2003, Architect Dean Sakamoto was commissioned



Axonometric Illustrating Green Technologies



2nd Floor Floor Plan
Main Floor

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Figure 1.5
Juliet Rice Wichman Botanical Center

to complete the design of Vladimir Ossipoff's original master plan for the National Tropical Botanical Garden (NTBG) on the island of Kauai. The final piece of the master plan was the design of the Juliet Rice Wichman Botanical Research Center (see Figure 1.5.) While describing the structural requirement for the building, Sakamoto indicated he chose concrete for his primary building material citing that "the building had to be lean (financially), but had to be a 100-year building, and also needed to withstand hurricanes" (Architect Magazine, 2013.) Ultimately the design consisted of a two-level concrete structure that cut into a hill above the garden, with the second level of the building visible from the street.

Through a combination of building materials and various green technologies the research center earned LEED Gold Certification. The research center was committed as a LEED building from the start of design and became the island's first green building. In order to maximize the building's sustainable potential, solar photovoltaic (PV) panels were utilized as an array on the roof to soften the overall energy load for the building. The panels themselves were welded to the roof membrane in order to account for wind disturbance, avoid points of penetration and carry a 30-kilowatt capacity (Architect Magazine, 2013.) Moreover, the roof system allowed for light penetration into the building through the use of skylights and included a rainwater collection system. Rainwater collected from the roof into a 25,000 gallon cistern was then used as irrigation for the garden which was neglected by the existing irrigation system. In a similar fashion, the building's interior utilized a minimal amount of materials. The concrete floor was stained with Lithochrome Chemstain rather than hardwood floors or carpeting, and in order to provide as much passive lighting as possible, glass walls were installed throughout the interior. An HVAC system, designed to maintain humidity levels, was incorporated among the lower level of the building which housed one of the nation's largest collection of antique botany books, as well as the herbarium, containing over 60,000 plant specimen. A key aspect to this project is not only the green design elements but the ability of the project to have little visual impact on its surroundings. As seen in Figure 1.5 the project uses natural materials and colors to effectively have little impact on the natural context of the site. Sakamoto continued the architectural theme from the original master plan, which featured guidelines siting visual sensitivity and natural materiality.

"This building responds to the site with artistry and site-specific wisdom."

– Chipper Wichman CEO and Director of NTB

Kauai Community Federal Credit Union – Kukui Grove West Office

"Very few projects in Hawaii obtain the Gold level certification and it is a true testimony to KCFCU's

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Figure 1.6
Kauai Community Federal Credit Union

commitment to the environment. It is the first credit union and first financial institution in Hawaii to obtain LEED certification on any level."

– Charles Kaneshiro, Group 70 International

Photo Credit: http://www.hawaiibusiness.com

The Kauai Community Federal Credit Union – Kukui Grove West Office received LEED Gold certification in 2012 (Kauai Community Federal Credit Union, 2012.) The two-story, 21,000 square foot project was designed by Group 70 International. The Kukui Grove West Office is considered one of the most environmentally sensitive projects on the island of Kauai. The project is was second LEED-certified building on Kauai. At the time the project was certified there were only four other LEED Gold certified buildings in the State of Hawaii.

The design of the Kauai Community Federal Credit Union focused on both the appreciation for the local community, as well as family and the environment - key aspects of Hawaiian culture. The management team's key focus was to use local products and companies. Primarily built by Hawaiian companies, the building was constructed using more than 30 percent recycled materials, 20 percent of which were recycled in Hawaii. The design team designed and implemented a waste diversion plan to help reduced the flow of materials to landfills. 64 percent waste generated by the project was directed through reuse and recycling.

Sustainable features on the project include a 1,000 square foot skylight in the front lobby (Rindilsbacher, 2012.) The skylight contains a special gel that blocks heat from entering the building and provides natural daylighting while PV laminates generate onsite electrical power. The paint finish on the roof reflects heat therefore, reduces the building's overall heat absorption. In order to reduce and treat stormwater, run-off special landscaping and natural bioswales have been integrated into the site design. Finally, the parking structure designates parking spaces specifically for hybrid vehicles.

The overall project received LEED-ND Gold certification receiving 39/69 possible points (Rindilsbacher, 2012) The project achieved a 50 percent reduction in potable landscape water use and 20 percent reduction in baseline indoor water use. The baseline building performance rating had a 24.5 percent improvement, achieved three percent onsite renewable energy and featured 50 percent FSC-certified wood products. Finally, the interior included 75 percent daylighting in occupied spaces and grated 90 percent of occupied spaces with quality views (see Figuer 1.6).

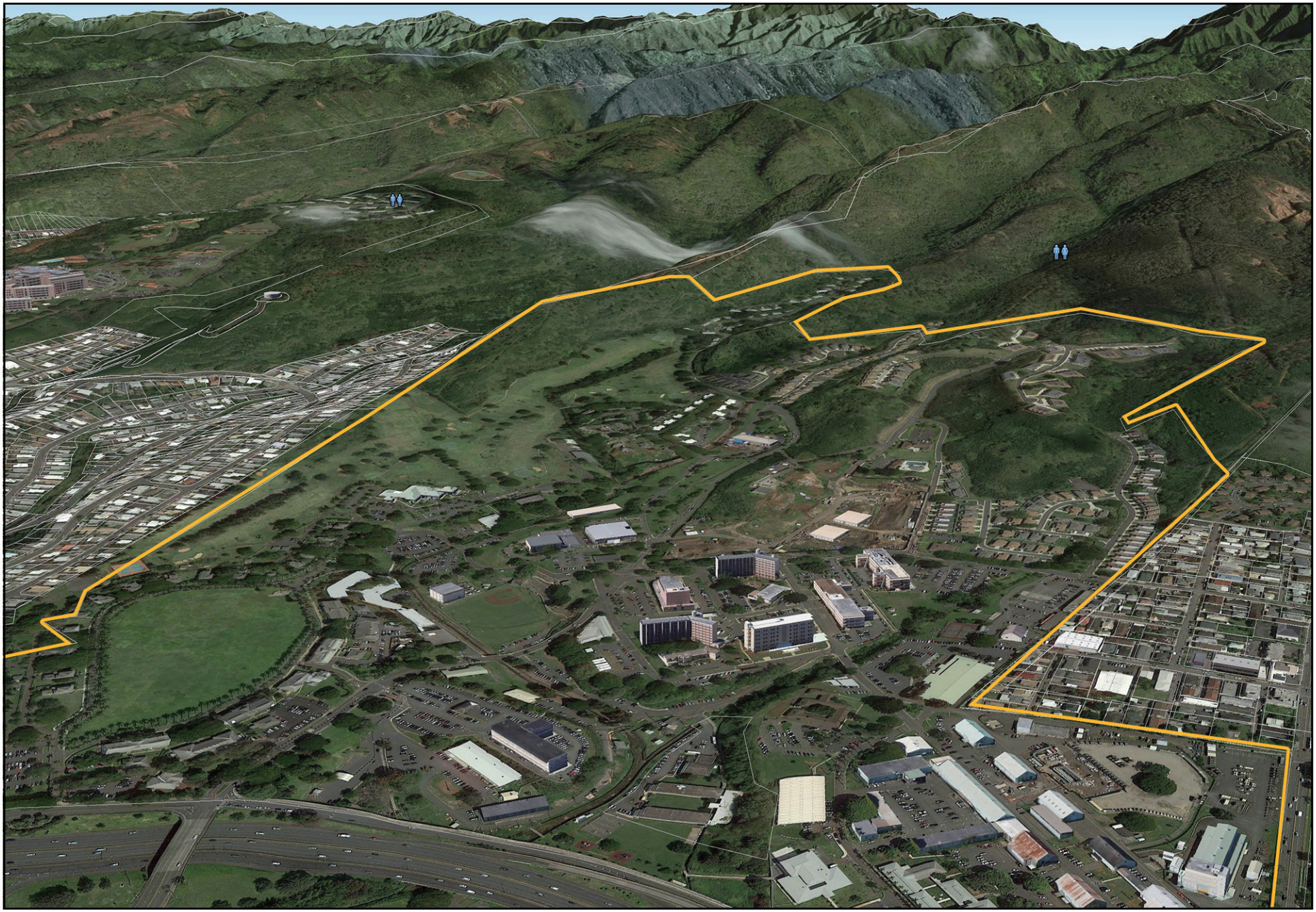

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Figure 1.7
Simpson Wisser Neighborhood

Simpson Wisser Neighborhood

Photo Credit: http://usarmy.vo.llnwd.net

"We're very excited to have this opportunity to help shape a sustainable development rating system that will be used in the U.S. and around the world. This project pushed us to do great things for sustainable development, design and construction and occupancy to meet the rigorous green building standards required by the USGBC."

- Dick Hawes, Executive General Manager, Lend Lease-Hawaii Region

The Simpson Wisser neighborhood located in Fort Shafter, Hawaii (see Figure 1.7) was selected among 238 neighborhoods nationwide to be a part of the USGBC's LEED for Neighborhood Development (LEED-ND) pilot program. This program was established to set the first national rating system for neighborhood development. One of the few LEED-ND certified projects to be located on a military installation, the Simpson Wisser neighborhood was only one of the many Island Palm Communities (IPC) residential developments that focus on sustainable development. The development placed an emphasis on green building practices from start to finish, with over 75 percent of the waste on the construction sites being reused or recycled. Sustainable materials were used in all new homes and the project featured an award winning tree preservation plan. Some the green elements featured in the home designs included dual flush toilets, PV power, solar hot water, energy efficient appliances and lighting. In addition, homes featured radiant barriers on roofs, ridge and eave vents, and high efficiency windows. Out of the 78 homes in the project 27 were LEED Gold certified and the remaining 51 were certified LEED Silver, with all the homes on site using 30 percent less electricity than the average standard home.

This project featured key strategies that could implemented on the Hanalei River Ridge project such as green site elements which included fine grading design to protect improvements, to prevent erosion and for on-site management of stormwater. Computer modeling was utilized to design new utility distribution and collection systems including water, sewer and storm drainage. National Pollutant Discharge Elimination System (NPDES) permits from the State of Hawaii's Department of Health Clean Water Branch were obtained (KASL Consulting Engineering, 2013.) Site sustainability and low impact design features of the project included crushing and reuse of all existing concrete slabs, footings, driveways and asphalt roadways, grassy swales, infiltration trenches and evapotranspiration for on-site stormwater management, and the preparation of a Stormwater Pollution Prevention Plan (SWPPP).

Case Study Conclusions

Each of the case studies were met with little opposition during the process from design to construction. A common trait among the three is community involvement. Each project had an aspect that benefited local companies. A key take away from these case studies, aside from the effective green design strategies implemented, is the way all stakeholders essentially played a role successfully completing of these projects. The Juliet Rice Wichman Botanical Center used local materials and companies in the construction process, as did the Kauai Community Federal Credit Union. The Simpson Wisser Neighborhood brought green development in Hawaii to the forefront. Green development is defined by the triple bottom line. This document will look at the social, environmental and economic factors involved with the Hanalei Plantation Resort development and ultimately outline a strategy that is most effective.

CHAPTER 2.0

PROJECT SUMMARY

2.1 Hanalei Plantation Resort Development Goals and Objectives

"Re-establish an economically sustainable resort and residential development around Pu'u Poa Marsh and along the Kauakaninunu Ridge (Hanalei River Ridge), integrated with the fabric and daily activities of community, that will increase public shoreline access and promote greater awareness among visitors and residents alike of the cultural, historical and ecological treasures of the project area in order to foster an on-going commitment to stewardship of the Wailei'a watershed."

– Preparation Notice for an Environmental Impact Statement (PNEIS), 2013

The overall goal of the Hanalei Plantation Resort Development is to re-engage the community and visitors to the natural resources offered in the Hanalei Bay region. In order to achieve this goal, the Ohana Hanalei, LLC has established the following objectives:

Photo Credit: EISPN, The Hanallei Plantation Resort, 2013

Objective 1: Restore employment opportunities and provide economic benefits to the region

The economy of the Hawaiian Islands relies heavily on tourism. One of the primary objectives of the Hanalei Plantation Resort Development is to provide a positive effect on the economy. According to the developers, a key strategy to reach this objective involves the development of transient occupied homes along the Hanalei River Ridge. These homes would ultimately serve two purposes, the first is to provide luxury style living for vacationers, and the second is to provide capital to develop the Hanalei Plantation Resort as a whole.

Objective 2: Cultivate environmental stewardship by restoring the Pu'u Poa Marsh to its original state

- The restoration of Pu'u Poa Marsh would seek to achieve the following:
- Integrate the resort into the existing context, community and daily activities
- Restore, protect and preserve the ancient Hawaiian fishpond wall that once existed on the site
- Promote an understanding of the history and environmental impact of the Pu'u Poa Marsh to guests, residents and broader community
- Increase wildlife population and provide educational opportunities by restoring the natural habitats
- Improve water quality by utilizing the fishpond and marsh's natural detention capabilities
- Provide increased shoreline access

Objective 3: Implement low impact, low density resort design that evokes the property's history of visitor hospitality

The newly designed resort is proposed to feature sustainable facilities and promote environmental stewardship while providing an experience rich in regional culture and history.

Objective 4: Cultivate community driven responsibility of the project by establishing ownership opportunities of the property

Involving the community in the project would achieve the following:

- Provide economic benefits to allow the restoration of the Pu'u Poa Marsh
- Preserve Hanalei Bay view planes through a set of design guidelines for the Hanalei River Ridge
- Promote environmental stewardship

2.2 History of the Project Site

In 1960, the Kauai Board of Supervisors approved development of the Hanalei Plantation Hotel on the Hanalei River Ridge, which included 210 hotel units, 49 unattached single-story cottages, a main building, two multi-story structures and a recreational building along the Hanalei River. The Hanalei Plantation Hotel was operated as the Club Mediterranean during the 1970's.

In 1973, Kauai County purchased the corner property of the Hanalei River after a proposed condominium development provoked community outrage. The beach was then named Black Pot Beach (Save Hanalei River Ridge Community Group, 2013.)

In 1979, the land was purchased by Hanalei Investment Corporation and Hanalei Development, Inc., represented by Stark Entities, and in 1980 a Special Management Area

User Permit, Project Development Use Permit and Class IV Zoning Permit were approved by the County of Kauai Planning Commission for constructing 90 multi-family dwelling units. In 1984 the Planning Commission approved an amendment to allow the development of 204 transient accommodation units and a main building. The Hanalei Plantation Hotel was demolished and construction of the Stark Entities development occurred from 1980 to 1986. Improvements included below-ground infrastructure and foundations for the hotel buildings and partial completion of framing and roof structures. The Stark Entities development, however was never completed. In the late 1980s the project was demolished with the exception of the infrastructure and building foundations which currently exist on the site today.

In 1987, Kauai County revoked Stark Entities' permits after two years of inactivity. The site was left abandoned, leaving behind concrete foundations. (Save Hanalei River Ridge Community Group, 2013.)

In 2007, Ohana Hanalei, LLC purchased the four parcels for $75 million. By 2012, the group released the proposal for the Hanalei Plantation Resort development.

2.3 Environmental Impact Statement Preparation Notice (EISPN) - Existing Environment Impacts and Mitigation Measures

Climate

North Shore Kauai has a moderate climate throughout most of the year and is considered to be semi-tropical with two seasons (EISPN, 2013.) Summer season, May through September, is warm and dry with northeast trade winds. The winter season runs from October through April, and consists of lower temperatures and higher rainfall. On average temperatures range from 64 degrees Fahrenheit to 85 degrees Fahrenheit, while humidity averages fluctuate between 66-69%. Winds speeds can reach up to 15 miles per hour from January through March. Annually, Kauai receives roughly 100 to 120 inches of rainfall.

Impacts and Mitigation:

The development is expected to have no significant impacts on the existing climate of the region. Ohana Hanalei, LLC does not anticipate the Hanalei Plantation Resort to affect temperature, wind or rainfall in the project area.

Geology and Topography

The island of Kauai is one oldest and most complex islands in the state (EISPN, 2013.) The project site is the Hanalei River Ridge and Pu'u Poa Marsh in the Hanalei Valley. The Hanalei Valley, composed of flat topography and wetlands, was formed by stream erosion and stretches roughly 12 miles.

Impacts and Mitigation:

Short term effects to geology and topography would result from the construction activities involving grading and excavation of both developed and undeveloped areas. Imported structural fill would be utilized where stability is required along the Hanalei River Ridge. The developers do not anticipate any long-term impacts on the area's geology and topography. Disturbed areas will be restored to their natural condition; however, periodical dredging may occur for maintenance purposes.

Soils

The soils within the project site are categorized as Rough Broken Land, Mokule'ia Series, Makapili Series, Beaches and Marsh by the United States Department of Agriculture Natural Resources Conservation Service (EISPN, 2013.)

Impacts and Mitigation:

Soil disturbances on the Hanalei River Ridge would involve grading and excavation to construct access roads, pathways, removal of existing foundations to restore grade, infrastructure improvements and building foundations. The developers have committed to offset potential water quality impacts per State and County regulations. A National Pollutant Discharge Elimination System (NDPES), a General Permit for Stormwater Discharges Associated with Construction Activities administered by the State Department of Health (DOH) will be required to control stormwater discharges of soil disturbances that exceed one acre. BMPs will be implemented as mitigation measures.

Surface Water

The Hanalei River is the closest surface water body to the project site. The river is a designated National Heritage River and is classified as a Class 1(a) inland water by the DOH (EISPN, 2013.)

Impacts and Mitigation:

Construction along the Hanalei River Ridge has the potential to affect nearby surface waters

due to siltation caused by soil disturbance from grading and excavation. The developers' mitigation efforts would follow State and County regulations governing grading, excavation, and stockpiling. An NPDES will be required for construction activity in order to control stormwater discharges. Site specific design will incorporate BMPs to offset required mitigation.

Flora

A botanical survey of the project site is being prepared by AECOS, Inc. The project site is primarily overgrown with non-native vegetation; however, due to the years of site inactivity, a few native species are found within the project site (EISPN, 2013.)

Impacts and Mitigation:

The construction that would take place on the Hanalei River Ridge is expected to displace some of the existing flora found on the project site. The impact of displacement is expected to be minimal; however, the landscape design of the proposed projects will incorporate new landscaping that will offset any loss in existing flora that may occur.

Fauna

A faunal survey of the project site was prepared by Rana Biological Consulting, Inc. in March 2012 (EISPN, 2013.)

Impacts and Mitigation:

Existing faunal and avifaunal habitats are expected to be disturbed short-term during the construction of the proposed Hanalei River Ridge. The disturbance would be mitigated by an increase in both quantity and quality of avifaunal habitat. The Draft EIS is expected to explain in more detail the effects of the development and the details of mitigation. The developers do not anticipate an adverse impact on existing faunal species.

Visual Resources

WCIT Architecture is conducting a visual resources study to be included in the Draft EIS. The study is expected to present photographic and computer rendered images of the visual impact of the proposed project on the Hanalei River Ridge.

Impacts and Mitigation:

The proposed homes on the Hanalei River Ridge would be visible from the Hanalei Bay

shoreline and at specific vantage points along the highway. The largest visual impact, hypothesized to take place on Black Pot Beach, located directly west of the ridge, is a major concern of the Save Hanalei River Ridge community group. The final visual impact is undetermined at this time. Mitigation measures will take place once the impact is established.

Photo Credit: http:/./www.savehanaleiriverridge.com

CHAPTER 3.0

DESIGN DEVELOPMENT

3.0 Design Development

The purpose of this chapter is to evaluate the overall site and take into consideration the social, economic and environmental factors that will ultimately determine a suitable development area for the Hanalei River Ridge.

3.1 Land Use – Implementation of the North Shore Development Plan

Socioeconomic Considerations

"The diversity of interests among the residents of Hanalei provides a basis for potential conflict concerning future developments within the community. On the other hand, the residents are united in their general appreciation of the community as a place to live. There is little desire to transform the area into a bustling, industrialized metropolis. The compatibility of the major goals concerning the preservation of both agriculture and natural scenic beauty form a solid base for active cooperation of the residents in planning for the future of the community. Resort development is see as a threat to the major goals, but if kept within its limits, it is seen as providing needed jobs and consequent population growth in the area."

– North Shore Development Plan (NSDP, 1972.)

Respondents of the NSDP, rated community needs on a scale from one through ten; one indicates high priority, while ten indicates low priority. Maintaining the North Shore's scenic beauty received a rating of two, and thus, is considered a high priority (NSDP, 1972.) At the bottom of this list, resort development, received the lowest rating of 10 and was designated undesirable. The NSDP states that a resort development should only occur in the Project District and Princeville in order to ease the concern of conflict between resort developments and the goals of preserving the natural environment and scenic beauty. The current design of the Hanalei River Ridge, being proposed by Ohana Hanalei, LLC does not meet the intentions of the NSDP, as there is a lack of consideration for the natural landscape in the current design proposed by Ohana Hanalei, LLC. The community as a whole recognizes the importance of maintaining environmental conditions over the need for resort developments.

The North Shore Development Plan is lacking areas of transition in land use. The Hanalei River Ridge provides a prime example for such transition areas. Due to the division between development and environmental management, a balance must be found in which transitional land use practices are implemented. The Hanalei Plantation Resort development has an opportunity to develop the Hanalei River Ridge in a way that meets the economic needs of the community while maintaining the existing environmental conditions of the area.

Maintaining the Natural Landscape per the NSDP

The natural landscape of the North Shore of Kauai has both intrinsic and extrinsic value to man. "The intrinsic value relates to the use appropriate to the land without the destruction of the environment" (NSDP, 1972.) The extrinsic value relates to the senses of man, "locations have universally pleasing effect as a result of many factors: the height of a mountain, the color of water, the smell of salt spray" (NSDP, 1972.) Development not only has effects on the natural environment, but it is important to note the effects on man. This fact raises the issue of what types of land are suitable for development. Lands most suitable for development have a slope of 20 percent or less and occur between river valley plains and the mountains (NSDP, 1972.) A key aspect in the NSDP is to maintain the rural character of Kauai's North Shore. Ruralness is described as landscape settled by man where man-made objects do not dominate the existing natural environment. "When arbitrary forms and man-made materials begin to dominate a landscape, the ruralness has gone." (NSDP, 1972)

The proposed development along the Hanalei River Ridge has the potential to dominate the view plane of the Hanalei River and even more, the Hanalei Bay as a whole and is the primary concern of the Save Hanalei River Ridge community group. The community group believes that history has shown that developers cannot be trusted. Developers of Kalapaki have agreed to respect a 25 foot height limit, by building four to five story homes that travel down the ridge rather than up ("What Could Happen", 2013.) The St. Regis hotel, currently located directly north of the project site, have claimed that they will build cascading structures of dark materials that would have minimal visual impact. In the end, community members believe that the St. Regis hotel did not follow their own criteria. For this reason, Ohana Hanalei, LLC has encountered many resistant voices to their proposed development.

NSDP Shared Goals and Objectives

The North Shore of Kauai has a variety of users and stakeholders. The compatibility of goals and objectives that focus on development and the natural environment are crucial elements to consider. In coordination with the Citizens Planning Committee, the NSDP created a set of goals and objectives that comply to the needs of all stakeholders. Various components that were considered in their study will be an emphasis of the green design guidelines outlined in this document for the Hanalei River Ridge.

Specific NSDP (1972) project goals consistent with the developmental needs which apply to this project include:

Goal A: To preserve the unique natural beauty of the North Shore Planning Area

- Objective 1: To identify those features of natural beauty and the measures necessary to assure their preservation

Goal B: To preserve the rural charm of the North Shore Planning Area

- Objective 1: To provide for the development of man-made features that do not visually overwhelm the existing small structures, the prevailing plan materials and soft ground cover (landscape treatment)
- Objective 2: To provide for the development of man-made features that will not require extensive services or modifications to the landscape - those not in harmony with the rural character
- Objective 3: To prevent regimentation and repetition that so often results from standards that emphasize conformance, in place of performance

Goal D: To provide for the economic growth and development of the North Shore Planning Area

- Objective 3: Study the feasibility and consequences of tourist recreational facilities within the North Shore Planning Area

Goal E: To preserve the wildlife and flora of the North Shore, recognizing man's dependence upon this preservation for his own health and welfare

- Objective 1: Identify the habitats of birds, fish and animal life, while providing programs for the preservation of endangered species
- Objective 2: Identify the major vegetation patterns and develop programs for the preservation of significant forests, particular species or plant associations

Princeville Design Control (NSDP, 1972)

The project site is designated as RR-20 per the NSDP (see Figure 3.1) and is visible from most local beach areas from Hanalei to Haena. The existing resort is documented in the NSDP as reducing the regions "sense of isolation and natural environment". It is recommended that the County encourage homeowners to paint roofs darker colors and to introduce more plant materials around proposed buildings. The NSDP recognizes the need for environmental sensitivity design; however, via Project Design Control Standards the NSDP places ultimate

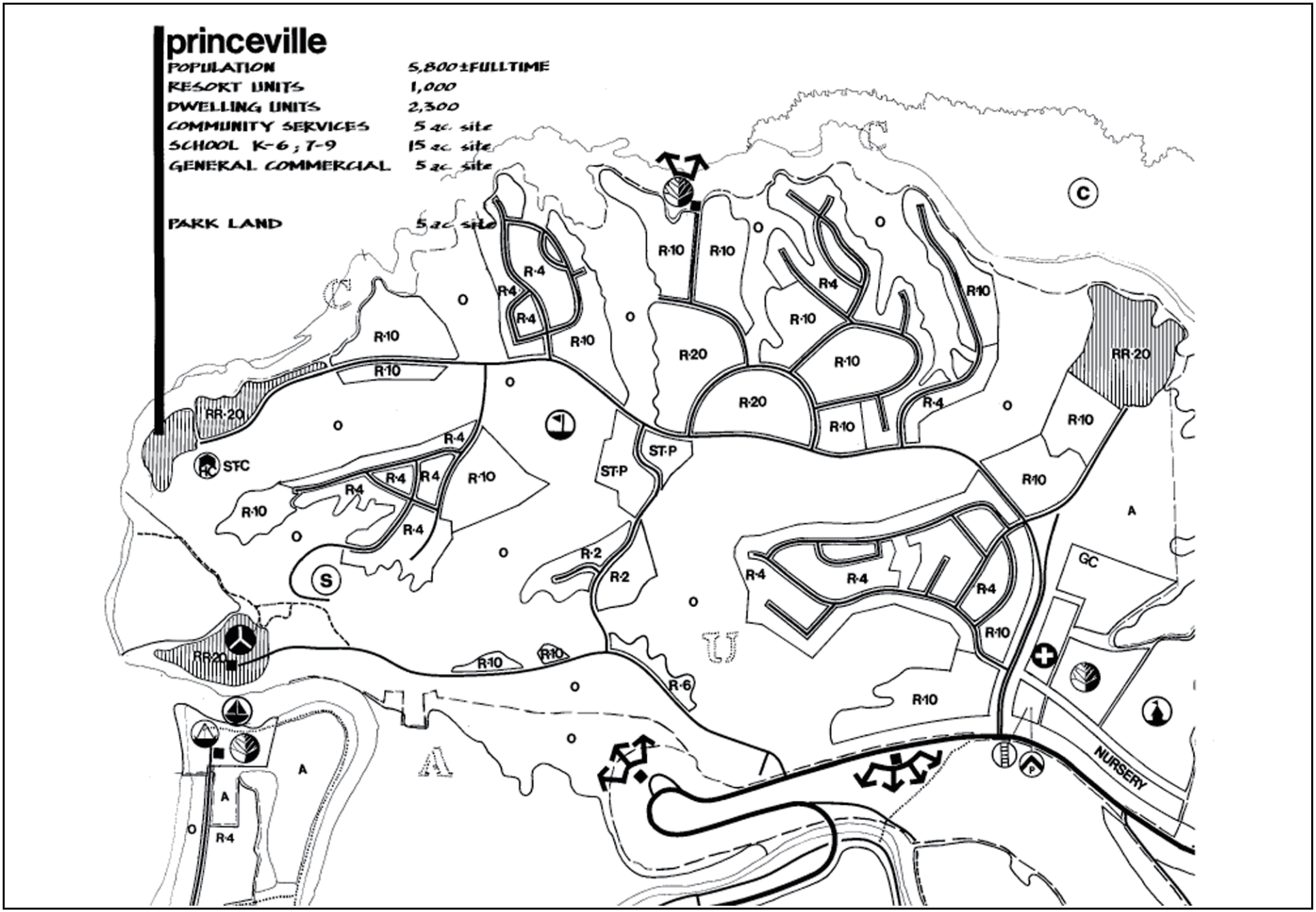

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Figure 3.1
Princeville Land Use Plan

Photo Credit: NSDP, 1972

design control in the hands of developers. Therefore, the environmental sensitivity is directly linked to the involved parties, as it neither encourages nor discourages environmental conscientiousness. These design guidelines seek to define the Project Design Control Standards for the Hanalei River Ridge.

3.2 Low Impact Design (LID)

What is Low Impact Design?

LID considers the needs of all stakeholders involved on a project. Elements of site design, including stormwater and wastewater infrastructure should be performed in unison with architectural design.

The basic three step phasing process of LID consists of (Horseley Witten Group, 2006):

- Avoiding Impacts – Preserve natural features and use conservation techniques
- Reduce Impacts – Reduce impervious surface
- Manage Impacts – Utilize natural features and natural low-impact techniques to manage stormwater and wastewater

The benefits of low LID include (Horseley Witten Group, 2006):

- Reduced long-term operation and maintenance costs
- Increased property values
- Easier compliance with wetland and other resource protection regulations
- More open space for regulation
- ncreased pedestrian friendly neighborhoods
- Protection of sensitive forests, wetlands and habitats
- Expanded aesthetically pleasing and naturally attractive landscape

3.3 Ohana Hanalei, LLC Alternatives

Ohana Hanalei, LLC recognizes that due to of the size and topographical features of the project site, there is a wide range of potential development alternatives. The alternatives range from maximizing the sites density to taking "no action".

"No Action" Alternative

The "no action" alternative would be implemented if the developers decided not to pursue the development of the preferred alternative. The "No Action" Alternative would retain the

existing conditions of the site. The development team noted that the "No Action" Alternative would not prevent future development from occurring on the project site (see Figure 3.2.) This proposed development plan is most favorable to the Save Hanalei River Ridge community group.

Preferred Alternative

This alternative is the the proposed plan previously described in chapter 1 (see Figure 3.3.)

No Ridge A Alternative (Resort and Residential)

The No Ridge A Alternative recognizes the community members do not want development of the Hanalei River Ridge to take place. Although this view is not the consensus, the development team considered several alternatives that would accommodate the requests of the community. The No Ridge A Alternative increases the density and massing of buildings throughout the project site, while retaining the resort and marsh restoration. The density increase is designed to generate the capital necessary for the project to take place (see Figure 3.4.)

No Ridge B Alternative (Residential Only)

The No Ridge B Alternative maximizes the value of a residential only development. In this alternative the restoration of the marsh is less intensive because of an anticipated lack of capital from the residential units (see Figure 3.5.)

Conventional Alternative

The Conventional Alternative is profit driven and takes advantage of existing land entitlements to target the market demand. This alternative proposes the development of 410 total units including the restoration of the marsh and does not reflect the maximum density allowed however it reflects the maximum density feasible (see Figure 3.6.)

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Figure 3.2
No Action Alternative

Photo Credit: EISPN, The Hanallei Plantation Resort, 2013

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Figure 3.3
Preferred Alternative

Photo Credit: EISPN, The Hanallei Plantation Resort, 2013

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Figure 3.4
No Ridge A Alternative

Photo Credit: EISPN, The Hanallei Plantation Resort, 2013

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Figure 3.5
No Ridge B Alternative

Photo Credit: EISPN, The Hanallei Plantation Resort, 2013

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Figure 3.6
Conventional Alternative

Photo Credit: EISPN, The Hanallei Plantation Resort, 2013

3.4 Site Disturbance / Steep Slopes

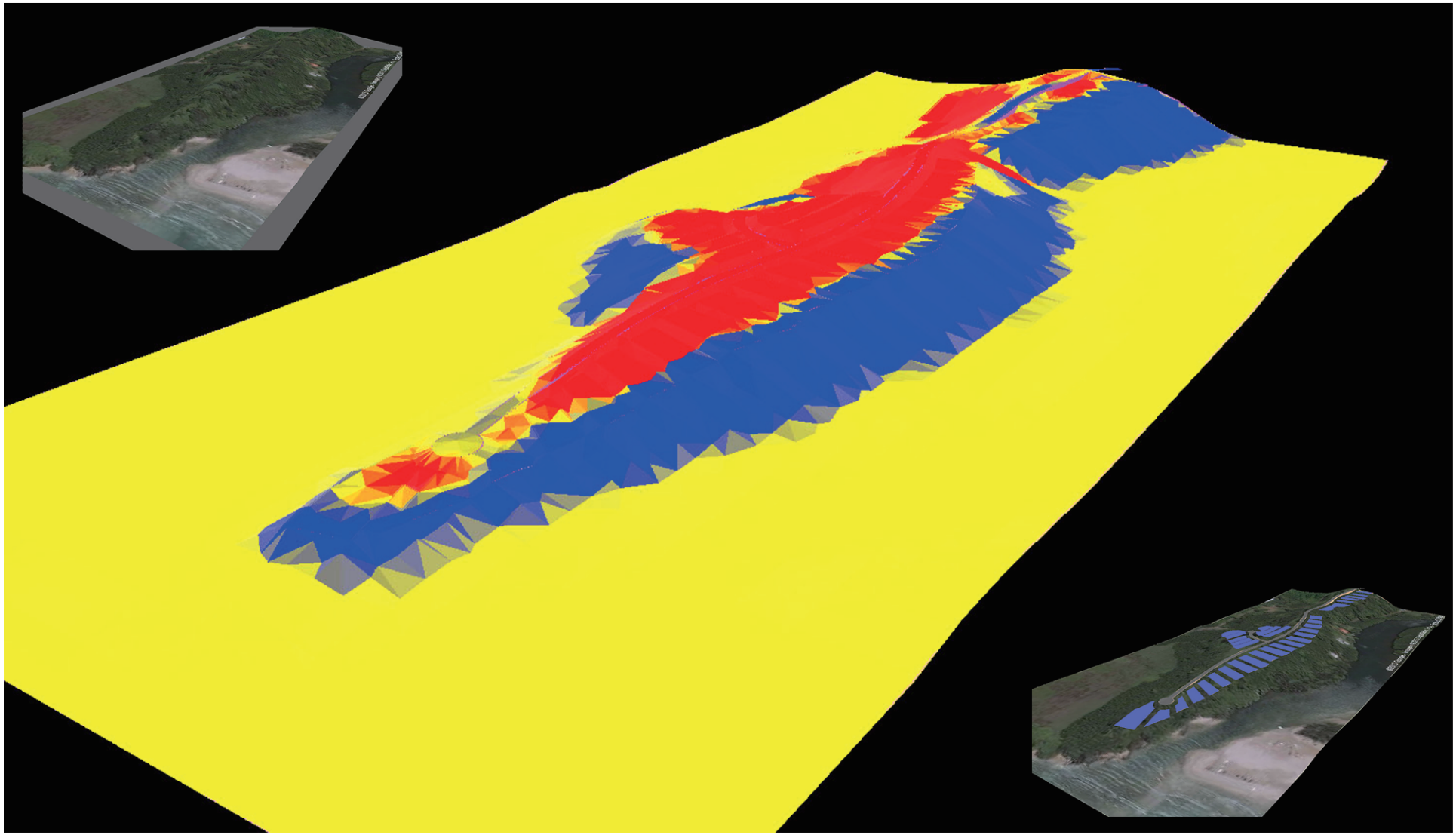
Utilizing the latest technologies in land development two studies were conducted in order to evaluate the proposed project. A site disturbance analysis was conducted to evaluate the proposed project and how much of the existing site may be impacted. A steep slopes analysis was then conducted to see if the current proposal is consistent with the existing site conditions.

Site Disturbance Analysis

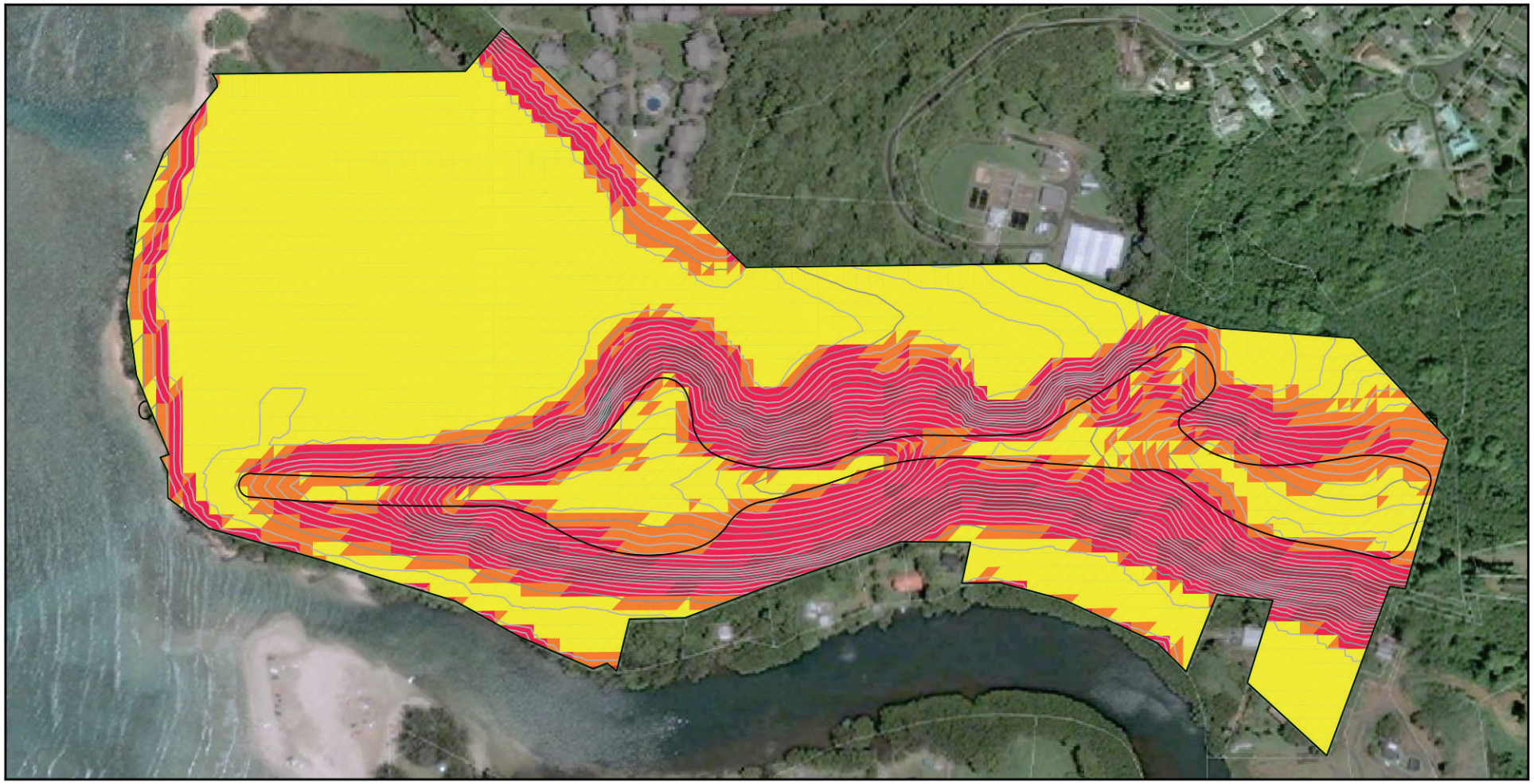
SiteOps software, a tool that takes the current proposed lot configuration and based on parameters set by the end user, grades the site to its optimum condition, was used to determine the disturbed area of development caused by the current plan. For the purpose of this analysis a 2:1 slope condition, which is common in land development, was utilized to meet the developing demands the proposed lots (see Figure 3.7.) The yellow represents areas that were not disturbed. Blue represents areas where additional dirt (or fill) will need to be added in order for the lots to be built. Alternatively, a large retaining wall may be constructed instead of adding dirt. The red represents areas where dirt will need to be removed. If the removed dirt is not utilized as fill, displacement would have to be accounted for. Not only would a dump site be needed, but the adverse effects on the environment due to the relocation of the dirt would be extremely harmful on the environment and may even impact additional areas of the site and its context. It is important to note that the results of this study are conceptual by nature and do not reflect final engineering in anyway. Based on this analysis it can be determined that the proposed project, as it stands today, is not feasible. The claim that it is environmentally sensitive and minimizes site disturbance is proven to be false under this study.

Steep Slope Analysis

Generally, the State of Hawaii shore zones have a 40 ft setback from the point of the shore to the vegetation that shall not be disturbed (NSDP, 1972.) In addition, areas with a slope of 20% or greater are considered unsuitable for development due to soil slippage and construction on slopes tend to become highly visible in natural landscape areas. Typical steep slope regulations in land developments require that proposed developments not occur on the steep slopes greater than 25%. For the purpose of this study, a steep slope analysis was conducted measuring slopes ranging from 0% to 15%, 15% to 25%, 25% to 50% and 50% or greater. The results presented that approximately 32% of the Hanalei Plantation Resort



Development site is not suitable for development. The areas not suitable for development can be seen in orange and red (see Figure 3.8.) It is important to note that the results of this study are conceptual by nature and do not reflect final engineering in anyway. Based on this analysis it can be determined that the proposed project, as it stands today, is not feasible. The developable area would need to be adjusted based on the NSDP requirements. That being said, it is also understood that the project site was previously disturbed; therefore, may not fall under these steep slope regulations. However, since the site has been abandoned for over 20 years and has maintained a natural condition during the extent of that time, it can be argued that the site, as it exists today, is no longer in a disturbed state.



Slopes Table				
Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	15.00%	1590468.81	
2	15.00%	25.00%	416314.17	
3	25.00%	50.00%	635389.51	
4	50.00%	100.00%	313766.11	

DESIGN GUIDELINES

INTRODUCTION

Photo Credit: http:/./www.savehanaleiriverridge.com

Introduction

Based on the analysis in the previous chapters the following design guidelines were established. The design guidelines consists of two principal components: water quality guidelines and architectural design guidelines. The water quality design guidelines will address issues concerning stormwater and wastewater treatment for the Hanalei River Ridge. The architectural design guidelines will address issues of green development and compliance with concerns of local community with respect to community character and view planes. An environmentally sensitive design is the objective of the guidelines concerning the site plan, architectural theme and details, building mass and scale, materials and building articulations.

Photo Credit: http:/./www.savehanaleiriverridge.com

CHAPTER 4.0

WATER QUALITY DESIGN GUIDELINES

4.1 Purpose

The scope of this analysis addresses the addition of 34 single-family residential lots along the Hanalei River in a previously disturbed area. The property has been previously permitted as Resort land; however, the property is currently left as vacant open space. This analysis seeks to assimilate BMPs for the development in an attempt to preserve the current state of the Hanalei River and Hanalei Bay. Permanent BMPs will be designed and recommended for future residents of the proposed development.

4.2 Hanalei Bay Watershed Information

Watershed

The project is tributary to the Hanalei Bay watershed - a 33.1 square-mile area draining to Hanalei Bay along the north shore of Kaua'I, which includes the Hanalei River, Waioli Stream, Waipa Stream, Waikoko Stream and the Waileia/Puupoa Stream watersheds. (see Figure 4.1) The largest of these watersheds in the Hanalei River watershed, stretching 23.6 square miles and comprises roughly 73 percent of the Hanalei Bay drainage area (Environmental Protection Agency, n.d.)

Agriculture, grassland, urban areas, as well as, other streams drain to the Hanalei Bay. The 16-mile Hanalei River passes through the Hanalei National Wildlife Refuge (NWR) managed by the U.S. Fish and Wildlife Service, which houses taro fields and bird impoundments. Urban areas within this watershed comprise less than one percent of the land area and are primarily located in the Hanalei town center along Kuhio Highway.

Impairments

Bacteria, sediment and nutrients are the predominant water quality problems facing the Hanalei Bay watersheds. Waters that do not meet water quality standards among the Hanalei River, such as the stream for Enterococci and turbidity, stream estuary for Enterococci and turbidity are included in the State's Clean Water Act, Section 303(d) list of impaired waters.

Sediment concentrations, which affect turbidity, are associated with human activity, including the introduction of construction activities related to development, and natural conditions, such as precipitation and steep slopes. Sources of bacteria include natural sources, such as aquatic and terrestrial wildlife, and human sources such as cesspools, septic tanks, as well as sewage disposal from boats along the coastline, trash and pet waste. Nutrient loadings are associated with sediment, wildlife, fertilizers and sewage.

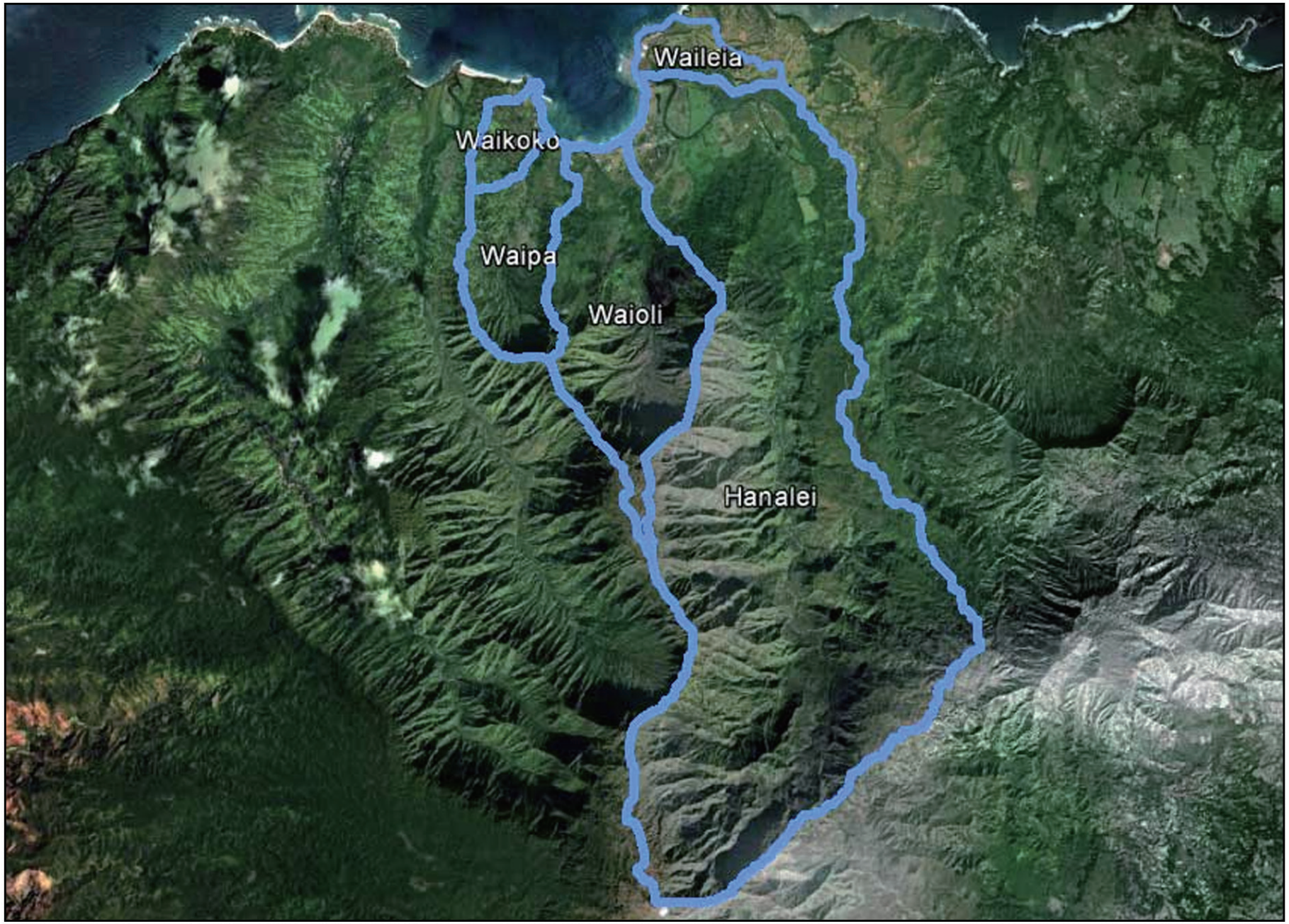


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Figure 4.1
Hanalei Bay Watershed

Photo Credit: http://www.epa.com

4.3 Permanent Best Management Practices

Low Impact Design guidelines

The following items are to be listed as 'required low impact design' criteria per these design guidelines:

Optimize Site Layout

Utilizing topography to optimize the site layout and reduce the need for grading would decrease the environmental design impact. Development envelopes should be focused in the upper elevation of the site to promote sheet flow and natural surface drainage to BMPs and Integrated Management Practices (IMPs) at the lower elevations of the site. The Hanalei Plantation Resort project will utilize natural drainage patterns, concentrating the impervious areas to the upper elevations. In addition, storm waters will be conveyed from upper elevation to landscape regions to the north before entering the public storm drain system.

The Hanalei Plantation Resort project intends to conform the site along natural landforms, avoid excessive grading, and disturbance of vegetation and soils, while replicating the site's existing drainage patterns. Disturbances will be limited to areas necessary for demolition and development. The project development will be set a sufficient distance from the Hanalei River Ridge and other neighboring bodies of water. Finally, the hillside areas of the project will be preserved to the maximum extent possible.

Minimize Impervious Footprint

The proposed Hanalei Plantation Resort project design shall not increase the impervious surface of the existing site, as the addition of the impervious surfaces would require mitigation through detention basins and/or bioswales in order to lessen the impact on the existing conditions of the site. The building footprints will contain multiple stories, to maximize building density for marketing demands, that will not exceed the height limit. Finally, according to the North Shore Development Plan, access lanes, private streets/drives, parking areas, pedestrian drop-off areas and loading areas will be designed with minimum pavement width. These paved areas, constructed using permeable pavement, shall be utilized to minimize imperious surfaces and promote bio-infiltration.

Disperse Runoff to Adjacent Landscaping and IMPs

Impervious paving shall drain to landscape areas where practical. Curb cuts will be incorporated to direct parking lot runoff to bioretention areas. Rooftops will drain toward bioretention facilities for water treatment measures. Sidewalks, walkways and courtyards will drain toward bioretention facilities for water treatment measures. Furthermore, the project site will be designed to utilize natural drainage patterns, concentrating the impervious areas at the upper elevations. All, storm waters will be conveyed from upper elevations to landscape regions before entering the public storm drain system.

Design and Implementation of Pervious Surfaces

To promote natural infiltration, permeable pavement will be integrated into the design of private driveways and porous concrete will be utilized in the landscape design. Vegetated or green roofs will be implemented into all buildings, permitting lower heating and cooling costs, superior sound insulation, as well as, air and water quality benefits (detailed description under innovation). Other pervious surfaces will be considered for this project unless found infeasible based on utilization, paved surfaces may be necessary on site in areas containing waste storage or maintenance equipment.

Construction Considerations

Landscape topsoil improvement plays a significant role in maintaining plant health, therefore, soil compaction will be minimized in the bioretention landscape areas. Implementation of the proper soil amendments will improve the soil's capacity to retain moisture, which will reduce runoff and improve water quality. Moreover, the project shall adhere to the landscape guidelines outlined in the North Shore Development Plan.

Site Stabilization

The proposed Hanalei Plantation Resort project shall vegetate disturbed soils and slope with drought tolerant vegetation that adhere with the landscape guidelines outlined in the North Shore Development Plan.

4.4 Source Control Best Management Practices

Source Control BMPs are defined as land use or site planning practices, or structures that aim to prevent urban runoff pollution by reducing the potential for contamination at the source of pollution. Source Control BMPs minimize the contact between pollutants an urban runoff. The following BMPs will be incorporated in the proposed Hanalei Plantation Resort project to minimize the introduction of pollutants into the Hanalei River and the greater Hanalei Bay watershed.

The following items are to be listed as 'required source control' BMPs per these design guidelines:

Steep Hillside Landscaping

Steep hillsides will remain intact and remain in their natural condition. Site disturbance for any proposed development will minimize the impact on hillsides, which contain 25% or greater slope. Steep hillside areas disturbed by the project development shall be landscaped with deep-rooted, drought tolerant plant species such as rooted cuttings or hydroseed mix, and native or naturalized trees and shrubs selected for erosion control.

Use Efficient Irrigation Systems and Landscaping Design

Landscape areas will be designed to avoid over-watering and irrigation runoff. To further minimize irrigation costs, all proposed developments will incorporate native plant species. Irrigation systems will utilize computer-controlled, weather-based satellite controllers, linked by digital, local radio, phone modem or hardwire method. Site rain gauges or tipping rain buckets will be connected to rain shutoff devices to prevent irrigation during and after precipitation will be implemented into the design of the project. Customized irrigation systems will be designed specifically to each landscape area's specific water requirements. Finally, by means of master valves and flow sensors, flow reducers and shutoff valves triggered by a pressure drop will be implemented to control water loss in the event of broken sprinkler heads or pipes.

Design Trash Storage Areas to Reduce Pollution Contribution

Trash storage areas shall be paved with an impervious surface, designed to disallow run-on from adjoining areas and screened or walled to prevent off-site transport of trash. Trash

containers shall contain attached lids and placed under a roof or awning to limit direct contact with precipitation. Property owners shall be regularly engaged in trash pickup and sweeping of the property.

Employ Integrated Pest Management Practices

The project facilities staff will be trained in pest management and use of fertilizers. Integrated Pest Management (IPM), an ecosystem-based pollution prevention strategy that focuses on long term prevention of pests through a combination of techniques such as biological control, habitat manipulation, and modification of cultural practices and use of resistant plant varieties, will be implemented on the project site. Hardscape and landscape barriers will be installed to reduce the number of pests that are able to enter buildings. Pest control information shall be made readily available to future residents, HOA and facilities staff.

4.5 Green Roof Technology

Green Roof Technologies and Implementation

Green roof systems shall be utilized to offset proposed building footprints along the Hanalei River Ridge. In order to maintain the natural condition along the Hanalei River Ridge, green roof wetland habitats, including native plant species, shall be required as a mitigation effort for impervious surfaces caused from the construction of homes and/or other buildings. As an alternative habitat for some species, green roofs may be designed; however, should not be considered as justification to destroy natural ecosystems and must be inaccessible (Peck and Kuhn, 2013) Inaccessibility will be determined based on building height and usage. For example, the second story roof would be determined inaccessible as opposed to a second story balcony or outdoor common area. Moreover, the primary function of the roof systems is a water quality measure, followed by a passive green design strategy dealing with energy conservation.

Green roofs typically follow ecological models that use exposed ecosystem plant species. Many green roofs face the issue of extreme temperature fluctuations, direct solar radiation, unshielded wind and shallow mineral substrates with little organic matter (Thuring, 2007.) Water, however, is one of the biggest concerns when dealing with green roof systems. Green roofs are often eliminated from green design strategies when considering the amount of potable water usage needed to maintain these systems. Wetland roof systems offer a different approach; essentially, including water in green roof systems greatly increases the potential of the green roof to function efficiently. Wetland roofs contain additional thermal mass and temperature regulating capabilities. Therefore, these wetland systems are expected

to further prolong membrane life and make roof leaks even less likely (Thuring, 2007.) Research has also demonstrated that wetland roofs could extend the life of a waterproof membrane two or more years after the standard life expectancy (Wayland, R. 2002.)

Wetland roofs are evenly planted roof systems with wetland or marsh plants, which are regularly maintained. Such roofs, not only serve as a retention and purification method to treat stormwater, but also serve as a treatment method for domestic waste water to be used as grey water. Rainwater is typically gathered in cisterns and pumped on the plant mats in intervals for sufficient irrigation.

Wetland roofs offer a passive and natural air-conditioning system. As temperatures warm up heat is eliminated from the building through evaporation of the water (Song, et al., 2013.) When temperatures begin to cool down the wetland roof serves as excellent protection from heat loss due to its insulating properties. The structural durability of this system also offers protection for the roof during extreme weather conditions.

The primary benefits of a wetland roof system are the following:

- Temperature control from irradiation shielding and evapotranspiration of the artificially irrigated roof
- Retains 60 percent of runoff from stormwater, reducing any stormwater fees which may accrue
- Roof durability from temperature reduction and protection against direct UV-radiation impact reducing surface ageing
- Compensation of surface impermeability
- Reduction of the need of air-conditioning because of the passive cooling properties the roof brings to the buildings
- Microclimate improvements and reduction of hot spots during the summer months
- Filtration of air pollution and dust particulates
- Possible roof sewage treatment facility for grey water usage
- Creation of habitats
- View plane considerations

CHAPTER 5.0

ARCHITECTURAL DESIGN GUIDELINES

5.0 Architectural Design Guidelines

These design guidelines are intended to establish green design standards for the proposed development on the Hanalei River Ridge. The guidelines will help guide the development of an environmentally sensitive, aesthetically cohesive design that incorporates the natural topography and landscape of the existing site. The following are based on green design principles which seek to incorporate innovative strategies when dealing with environmentally sensitive sites.

5.1 Biomimicry

The concept of biomimicry in architecture is essentially a design strategy based on the principles of imitating natural processes in the environment. Biomimicry 3.8 and HOK worked together to come up on a new design strategy based on the concepts of biomimicry called Fully Integrated Design (FIT). The characteristics of FIT will be used as a tool in specifying a design strategy for the Hanalei River Ridge.

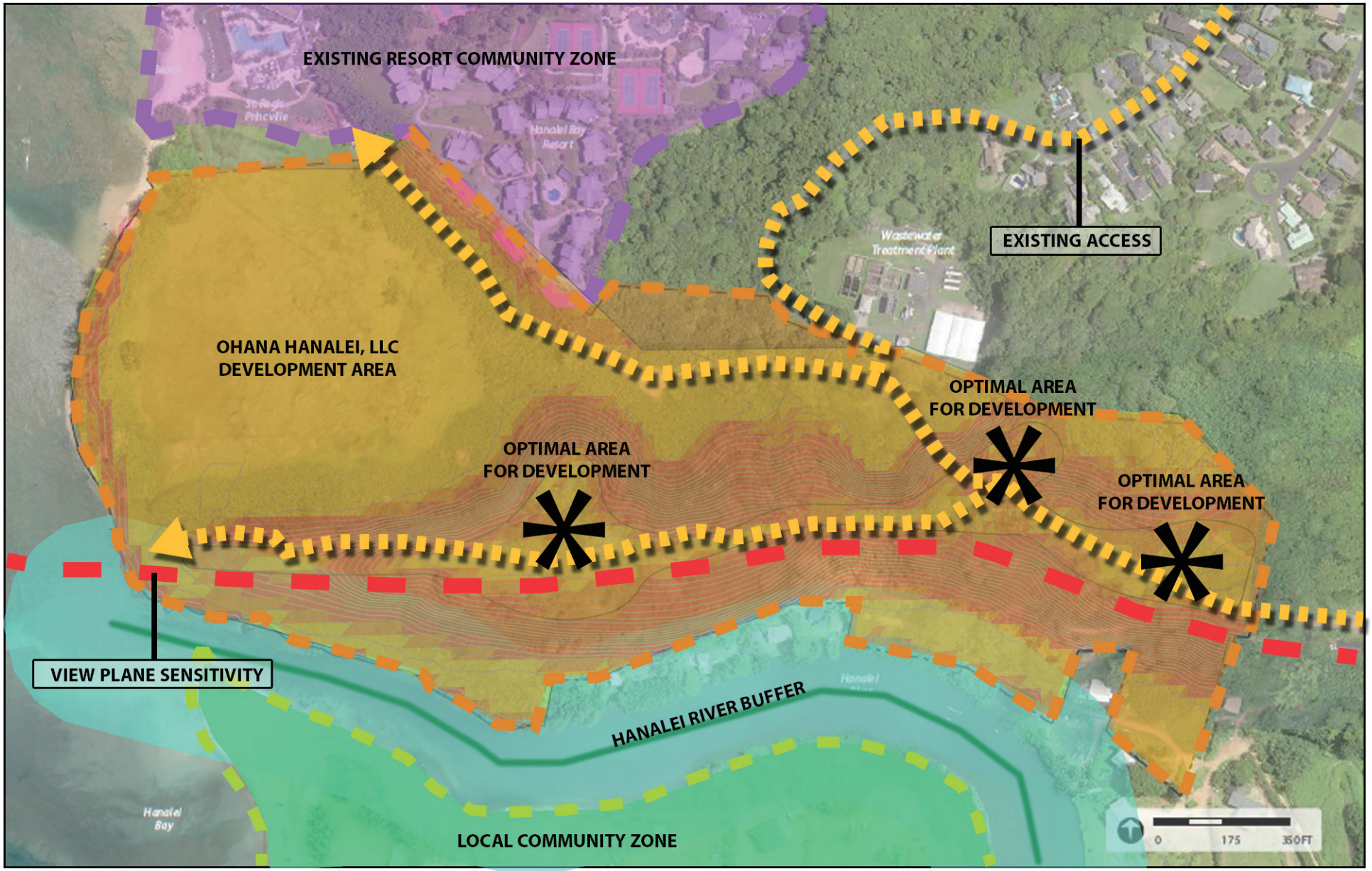
Fit is comprised of four characteristics (HOK, 2013):

1. Multi Lenses - FIT projects address multiple integrated lenses that support a triple-bottom-line approach. These lenses include ecostructure, water, atmosphere, materials, energy, food, community, culture, health, education, governance, transport, shelter, commerce and value.

   The multi lenses strategy is critical when dealing with a project with so many stakeholders. In this case you have the developers, the community, the county and the environment. When gauging all the factors involved it can be determined that in order for the development to take place a smaller development footprint along the Hanalei River Ridge is necessary (see Figure 5.1.)

2. Place-Based – FIT projects go far beyond a traditional site analysis methodology to incorporate a deep understanding of the local ecologies.

   The place-based strategy is directly associated with context. The Site Optimization analysis in Chapter 3 illustrates how every aspect of project must be considered in how it affects context. The size of a lot and the height and color of a building effect the context on both a micro and macro level.



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Del-Mem, 2014

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Figure 5.1
FIT Analysis

3. Rooted in Life's Principles – Biomimicry 3.8's synthesis of Life's Principles are at the foundation of FIT. Life's Principles represent the evolutionarily successful characteristics of all organism, if our designs mimic these principles, the spaces we create can adapt to perform and succeed over time.

   Life's Principles can be applied to the environmental principles, and how a project can affect our world and future. Furthermore, the Life's Principles can describe how decisions made today can affect what tomorrow brings. The deterioration of the coastal lands in Hawaii due to development is a very sensitive issue. As a result of little land and the need for economic growth the issue of where development should occur is central. Development on land such as the Hanalei River Ridge needs the level of environmental sensitivity that it outlined within this document.

4. Accountable - How will we know if we are achieving a positive outcome with our work? Our world needs accountability and the ability to quantify the ecological, social and economic value of our projects. The FIT process establishes a framework for setting goals, benchmarks and performance indicators.

   In order for the design strategy in this document to be effective, it has to be carried through to fruition. A common occurrence, which is a concern of local community groups is that the design guidelines put in place for the Hanalei River Ridge will be ignored by property owners once the lots are sold to individual parties. These guidelines would have to be regulated at a government level in order to be effective. The County showed their power in the area once before, specifically when a neighboring beach (Black Pot) had great opposition to a proposed development and the County put a stop to it. The strength of the County will need to be shown once again in order to fully regulate effective design guidelines that would protect the Hanalei Ridge, Hanalei River, Hanalei Bay and the greater Hanalei Bay watershed.

5.2 LEED for Neighborhood Development (LEED-ND) Strategies

LEED-ND takes the green certification concept beyond individual buildings and applies it to neighborhoods (NRDC, 2013.) LEED-ND is essentially a set of guidelines for environmental standards for land development. These standards in-turn can be useful to all stakeholders involved in the community planning and design process. This group may include neighbors, citizens, community organizations, leaders and government officials. The key

strategies of LEED-ND are organized into three categories: Smart Location and linkage (SLL), Neighborhood Pattern and Design (NPD) and Green Infrastructure and Buildings (GIB). Although many of the standards outlined in LEED-ND do not apply to the Hanalei River Ridge development, these standards do effectively measure relationship to context. This section will look at the three categories and identify the aspects that best apply to the proposed development.

Smart Location and Linkage

Credits within this category are earned by building on previously developed areas, where previous construction and paving has occurred (USGBC, 2013.) The project site on the Hanalei River Ridge has existing infrastructure in place from a previous development. The proposed project should utilize existing foundations as much as possible while developing the ridge. This category also discusses several credits that deal with environmental sensitivity. Several LEED-ND prerequisites limit development in specific areas, such as habitats, wetlands, water bodies, and floodplains. In addition, these credits are earned by including strategies that limit site construction impacts and protect steep slopes that can cause pollution to downstream lakes and rivers. Though the project site may not be considered a prime location, several strategies can be employed under this criteria to limit disturbance to the site and its surrounding context.

Neighborhood Pattern and Design

Efficient use of land minimizes the fragmentation of rural landscapes along watersheds and wildlife habitat, as well as, efficient neighborhoods group's uses (USGBC, 2013.) This section of LEED-ND is not completely applicable to a resort community; however, the ideals of compact neighborhoods and grouping uses are valid in the selection of project sites. The value in the Hanalei River Ridge is clear, yet this does not justify the development and disturbance of existing natural resources and choice of the project site as a whole. Neighborhood Pattern and Design focuses on grouping context, the Hanalei Plantation Resort development clearly ignores the context along the Hanalei River Ridge.

Green Infrastructure and Buildings

Green buildings place an emphasis on environmental sensitivity through design and incorporate strategies such as, energy and water efficiency, indoor air quality and recycled materials (USGBC, 2013.) Water efficiency will need to be addressed on both an indoor

and outdoor level of consumption. The reuse of existing elements is another key aspect in LEED-ND, utilizing existing foundations and roads on site are key in the overall attempt to achieve green design standards on the Hanalei River Ridge. Overall, the purpose of Green Infrastructure and Green Buildings is to reduce pollution, which is presented in the form of materiality selection, site selection, site planning and overall energy efficiency of proposed structures.

Based on the analysis of LEED-ND credits, any new Hanalei River Ridge development shall be required to achieve efficiency at a level of the following LEED-ND credits when applicable (USGBC, 2013):

- SSL Prerequisite 2: Imperiled Specie - Does not build on habitat where species are threatened, endangered or imperiled or creates a habitat conservation plan under the Endangered Species Act
- SSL Prerequisite 3: Wetland / Water Body Conservation - Does not build on wetlands or water bodies and leaves buffer of undeveloped land around them of at least 50 to 100 feet
- SSL Prerequisite 5: Floodplain avoidance - Does not build on floodplains
- SSL Credit 6: Steep Slope Protection - Limits development on steep slopes (greater than 15 percent) and restores many or all previously developed steep slopes with native or noninvasive plants
- SSL Credit 7: Site Design for Habitat / Wetland Conservation - Conserves pre-existing on-site habitat, wetlands, and water bodies in perpetuity
- SSL Credit 8: Restoration of Habitat / Wetlands - Restores degraded on-site habitat, wetlands, or water bodies and conserves them in perpetuity
- SSL Credit 9: Implements a long-term (at least 10 years), fully funded management plan for on-site wetlands, water bodies and habitat
- NPD Credit 12: Community Outreach and Involvement - Does either of the following:
  - Relies on multiple forms of community input and feedback to guide project concept and design, both before and during development
  - Relies on multiple forms of community input and feedback as above, but also conducts a design charrette or obtains an endorsement from a smart growth or jury program
- GIB Prerequisite 1: Certified Green Building - Include at least one building certified under LEED or a similar green building rating system.
- GIB Prerequisite 2 and 3: Meet minimum requirements for building energy and water efficiency.
- GIB Prerequisite 4: Construction Activity Pollution Prevention - Implement an erosion and sedimentation control plan for construction

- GIB Credit 1: Green Buildings - Include at least one building certified under LEED or a similar green building rating system
- GIB Credit 2 and 3: Building Energy and Water Efficiency - Provide superior building and water efficiency
- GIB Credit 4: Water - Efficient Landscaping - Reduce water consumption for outdoor landscaping
- GIB Credit 7: Minimized Site Disturbance in Design and Construction - Preserve heritage trees and previously undeveloped land
- GIB Credit 8: Stormwater Management - Retain and treat stormwater on-site
- GIB Credit 9: Heat Island Reduction - Use roofing and paving that reflects instead of absorbs solar heat
- GIB Credit 10: Solar Orientation - Increase passive and solar access by orienting building or dense blocks to maximize north and south facing exposure
- GIB Credit 11: On-Site Renewable Energy Sources - Generate renewable energy on-site
- GIB Credit 13: Infrastructure Energy Efficiency - provide energy-efficient neighborhood infrastructure
- GIB Credit 14: Wastewater Management - Reuse treated wastewater
- GIB Credit 15: Recycled Content in Infrastructure - Use recycled content in neighborhood infrastructure
- GIB Credit 16: Solid Waste Management Infrastructure - Provide neighborhood composting, recycling and hazardous waste collection
- GIB Credit 17: Light Pollution Reduction - Limit exterior illumination and direct it downward

5.3 Building Scale and Massing

Building Height Limit

Proposed buildings should reflect the human scale and imitate the natural condition of the site. Buildings heights should stack from the Hanalei River in a northward direction in order to respect the view planes currently existing in the region. Setbacks for the buildings from the Hanalei River shall be 200 feet with building heights set at a maximum height of 25 feet. Special attention should be given to the development edge along the Hanalei River and existing open areas, to provide visual and environmental sensitivity. A key aspect that shall be required of the overall articulation of proposed buildings will be to break up the scale of the proposed development while providing adequate space for the usage requirements (i.e., a typical single-family home).

Visible Edges

In order to ensure that residential development on the Hanalei River Ridge is aesthetically pleasing, all visible edges of homes within the community are subject to a certain degree of articulation. Rows of homes seen from a distance or a long a ridgeline are perceived in relation to their contrast against the skyline or background. The primary visual impact from this viewpoint is the shape of the building and roofline. Providing green roofs and articulating building form to conform to the natural topography will help alleviate a visually displeasing housing element. The NSDP and Ohana Hanalei, LLC both specify a need for visual edge treatment, however do not provide criteria or design strategy. The following is a framework to be followed by any new development on the Hanalei River Ridge:

- **High Visibility Elevations**

  Elevations with high visibility are those that are visible from public areas, such as parks, streets, trails and resort facilities. Elevations with high visibility must incorporate the following design characteristics:

  - Detailed articulation of building forms on the visible portions of high visibility elevations in the form of projections, openings, reliefs and green walls and facades shall be required.
  - The use of one story elements as a visual buffer from edge conditions. Dividing the building height into one, two and possibly three story elements, subject to a height limit of 25 feet and setback from the Hanalei River a minimum of 200 feet.
  - Roof details such as green roofs, wetland roof and planting elements incorporated in to the roof structure to reflect the natural aspects of the site in order to provide variations in rooflines
  - Natural accents and materials, such as stone, brick, wood or plant material for any façade facing public areas to ensure a minimal amount of visual disturbance
  - Keep elements proportional to the overall characteristics of the site
  - Vehicle access shall be limited to areas not facing the Hanalei River

- **Low Visibility Elevations**

  Elevations with low visibility are those that are only visible from internal lots of the Hanalei Plantation Resort development and the neighboring hotel and resort properties. These elevations will not require detailed articulation, however elevations with low visibility should still incorporate natural accents and tones and reflect natural aspects of the site.

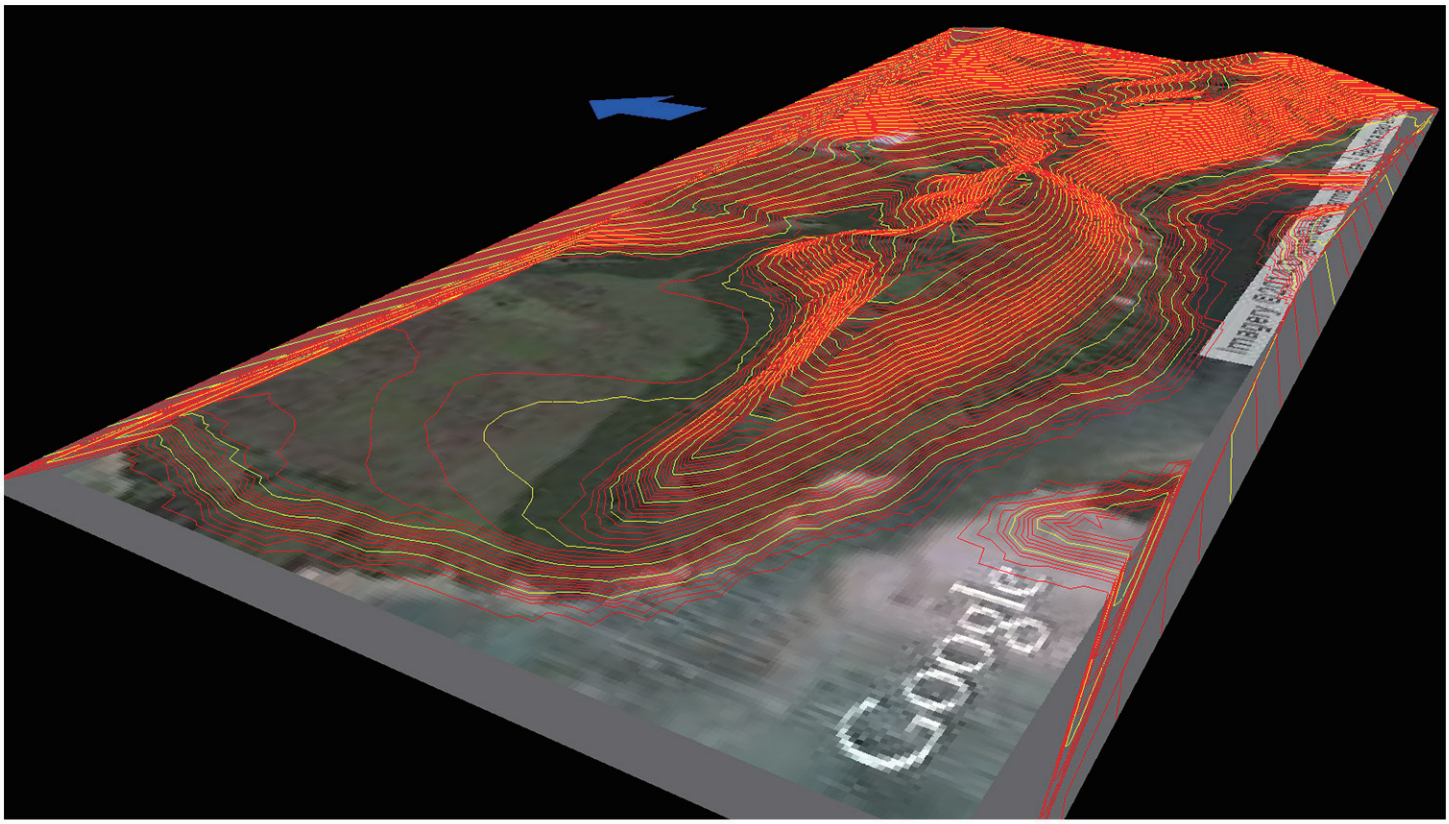
5.4 Conceptual Design Alternative

Conceptual Site Alternative

Based on the criteria outlined in this document a conceptual site plan depicts a more feasible solution for development concerning an environmentally sensitive area such as the Hanalei River Ridge (see Figure 5.2 - Figure 5.4.) This design is able to reduce disturbance on the Hanalei River side of the ridge by approximately 80 percent. In addition to balancing the amount of the dirt being moved on site, the design also places all accessible roads on the marsh side of the site. The Pu'Poa Marsh is being designed to naturally treat run-off, which is ideal when considering the overall site design, not just the Hanalei River Ridge itself. Furthermore, the current development plan does not include measures for treatment along the Hanalei River. While this plan is conceptual, it presents a significantly improved alternative to the current plan.

5.5 Conclusion

The Hanalei Plantation Resort development is seeking to develop the Hanalei River Ridge, which is considered by many community members as a valuable natural resource that should remain undisturbed for both visual and environmental reasons. The analysis in this document has shown that the current site plan for development is inconsistent with the North Shore Development Plan, Kauai General Plan and the overall existing conditions of the project site. For this reason it is my personal recommendation that the current site plan, as it stands today, should not move forward. The analysis has also shown that if developed efficiently, a compromise can be found between the developers and the community groups. Outlined in this document are a series of guidelines that if followed properly would allow for appropriate development of the Hanalei River Ridge.



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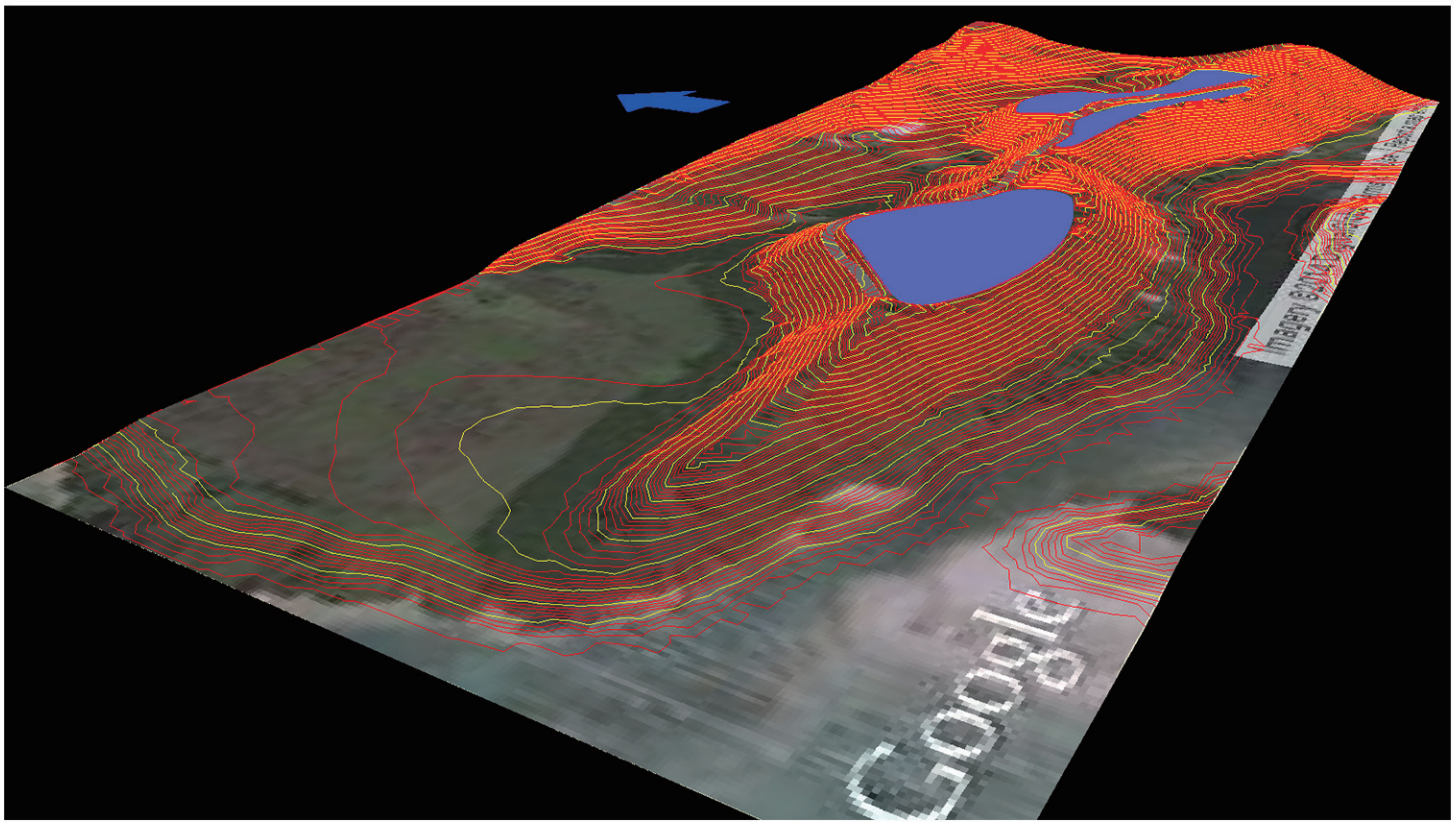

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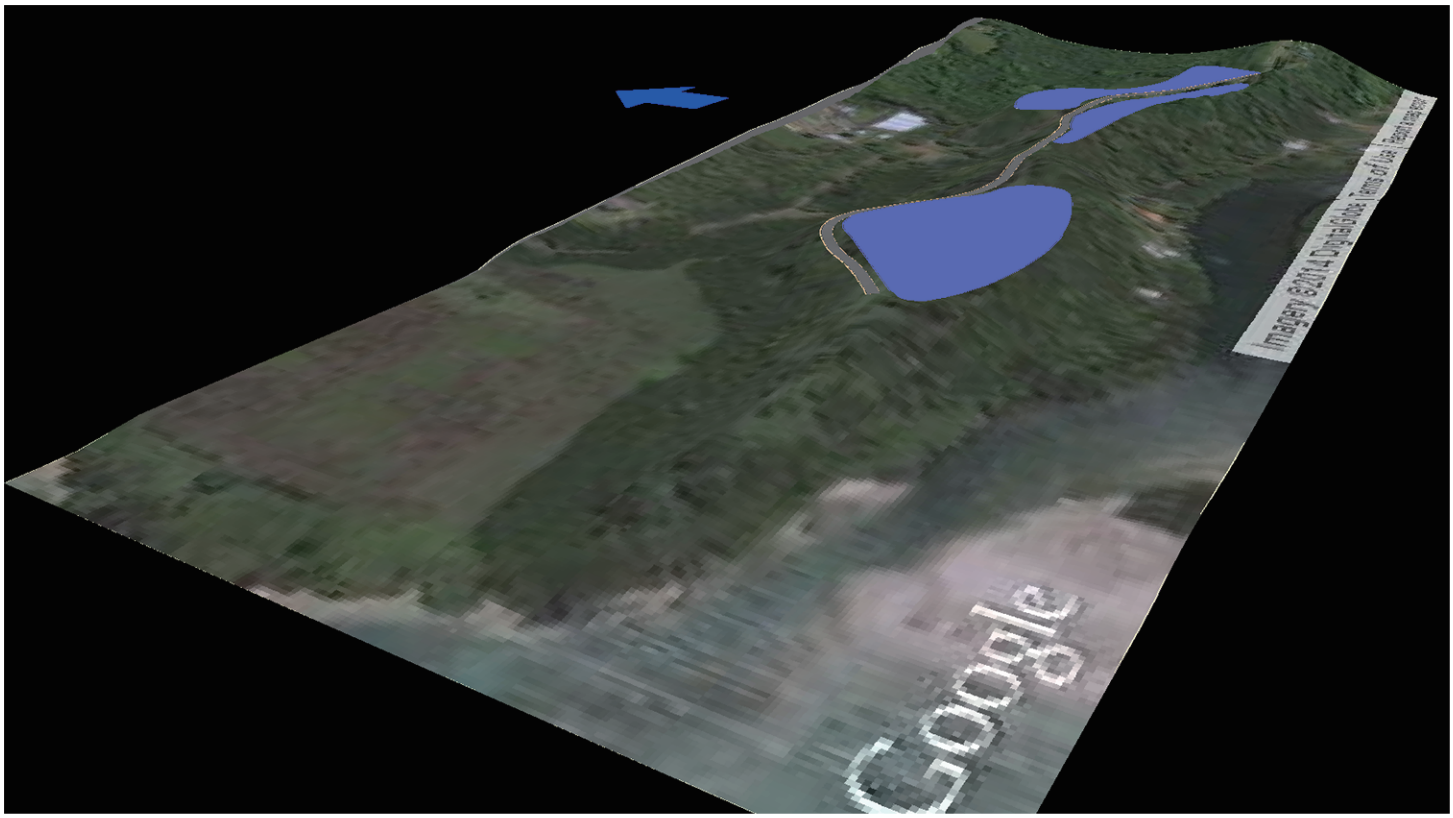

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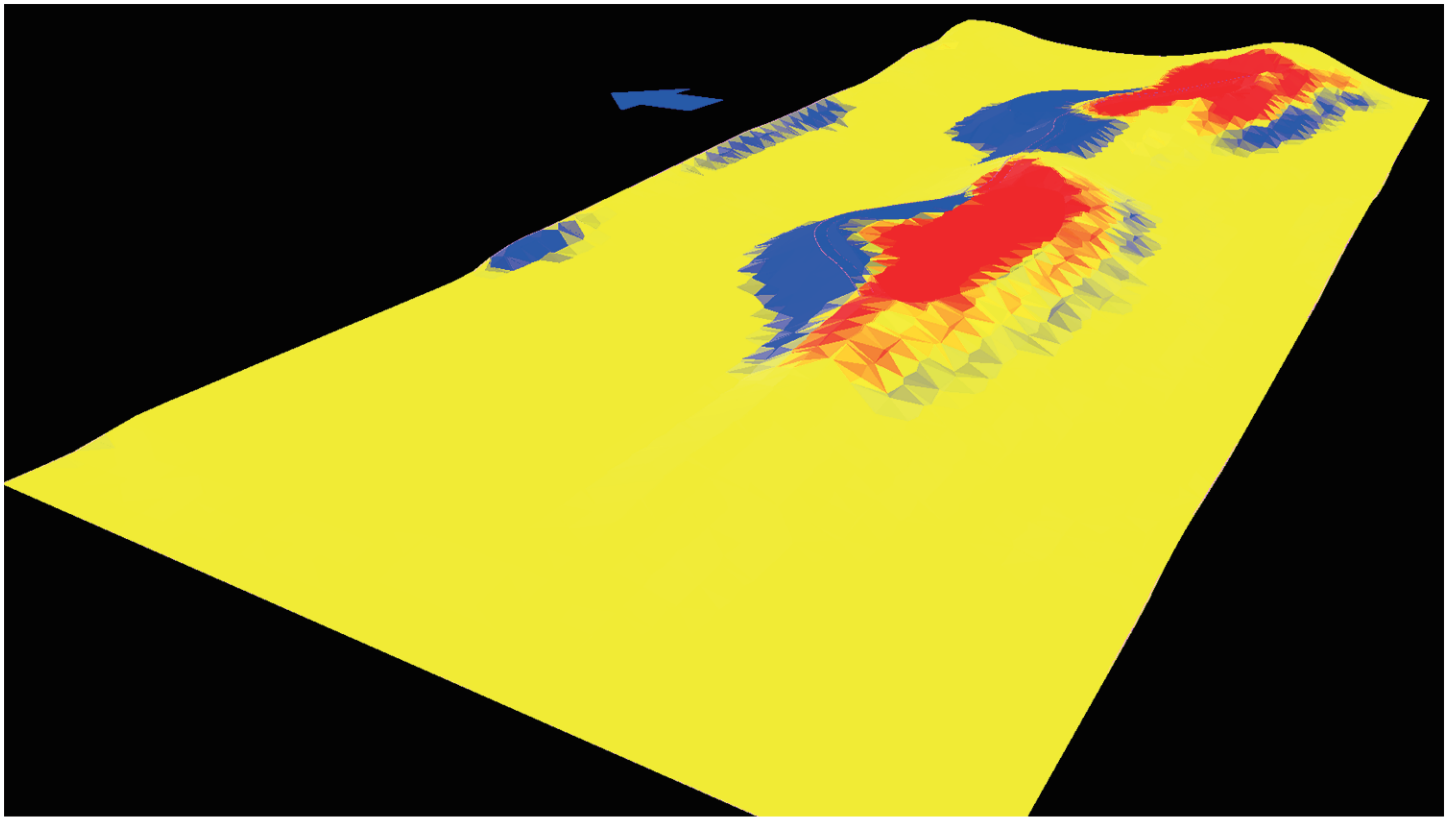
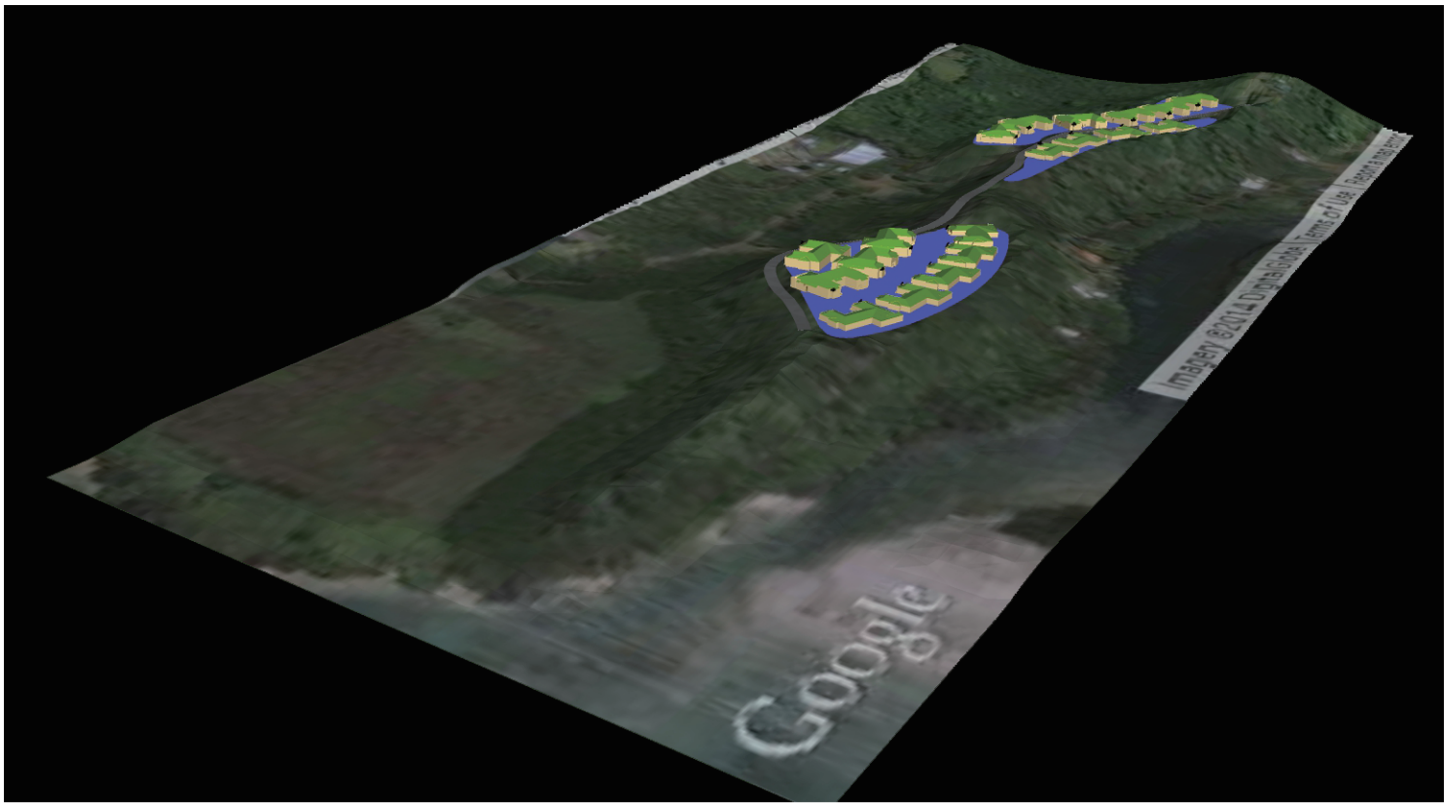


SITE OPTIMIZATION ANALYSIS OF THE PROPOSED ALTERNATIVE



PERSPECTIVE VIEW OF MASSING SCALE

NORTH ELEVATION

SOUTH ELEVATION

EAST ELEVATION

WEST ELEVATION

NOTE: THIS EXHIBIT IS CONCEPTUAL BY NATURE AND DOES NOT REFLECT FINAL ENGINEERING.

Nathaniel A. Mallari
Del-Mem, 2014

The Hanalei Plantation Resort Development
Green Design Guidelines for the Hanalei River Ridge

Figure 5.4
Conceptual
Development Massing

References

Works Cited

County of Kaua'i. (2012). The Kauai General Plan. Retrieved July of 2013 from http://www.kauai.gov/Government/Departments/PlanningDepartment/heKauaiGeneralPlan/tabid/130/Default.aspx

"EISPN: Environmental Impact Statement Preparation Notice." (2013). Office of Environmental Quality Control: Hanalei Plantation Resort, 1-83.

HOK. (2013). Natural Inspiration Through Biomimicry. Retrieved January of 2014 from http://www.hok.com/thought-leadership/natural-inspiration-through-biomimicry

Horseley Written Group. (2006). Erosion and Sediment Control Guide for Urban Construction. Retrieved December of 2013 from http://trca.on.ca/dotAsset/40035.pdf

Honolulu Civil Beat. (2014). Impacts of land use in Hawaii. Retrieved March of 2013 from http://www.civilbeat.com/topics/impacts-of-land-use-in-hawaii/

Architect Magazine. (2013). Juliet Rice Wichman Botanical Research Center. Retrieved July of 2013 from http://www.architectmagazine.com/projects/view/juliet-rice-wichman-botanical-research-center/780/

KASL Consulting Engineering. (2013). Case Study: Simson-Wisser Neighborhood ND Pilot: Fort Shater, Honolulu, HI. Retrieved January of 2014from http://www.kasl.com/PDFs-Services/1350_CaseStudy_SimpsonWisseLEED-ND.pdf

"North Shore Development Plan" (1972). Joint Ventures of Murods and Itagaki, Inc. & Eckbo, Dean, Austin and Williams, Inc. Retrieved July of 2013 from https://www.dropbox.com/s/gcrhgtgsvgxbhzy/north%20shore%20development%20plan.pdf

Rindilsbacher, A. (2012). Kauai Community Federal Credit Union Receives LEED Gold Certification. Retrieved January of 2014 from http://www.laytonconstruction.com/01302012_PR.html

Save Hanalei River Ridge Community Group. (2013). Defend Hanalei. Retrieved July of 2013 from http://www.savehanaleiriverridge.com/

Save Hanalei River Ridge Community Group. (2013). Defend Hanalei: A History of Kauakanionu. Retrieved July of 2013from http://www.savehanaleiriverridge.com/history-of-the-ridge/

Thuring, C. (2007). Just add water: Wetland green roofs for enhanced performance. Rana Creek Design. Retrieved January of 2013 from http://www.ranacreekdesign.com/wp-content/uploads/2011/01/article_GRIM_2007Fall_web.pdf

Wayland, R. (2002). EPA watershed initiative nomination. Retrieved July of 2103 from http://www.dwaf.gov.za/projects/eutrophication/Website%20Survey/United%20States/checklist.pdf

2011 Kukulu Hale Awards - Building community, building excellence: Recognizing excellence in Hawaii's commercial real estate industry. Hawaii Business. Retrieved July of 2013 from http://www.slideshare.net/corrin/hanalei-bay-watershed

Azambuja, L. (2013). Hanalei Plantation development takes first step. The Garden Island. Retrieved July of 2013 from http://thegardenisland.com/news/local/hanalei-plantation-development-takes-first-step/article_d64f4d18-80bf-11e2-9919-001a4bcf887a.html

Azambuja, L. (2013). Hanalei vs. Hanalei. The Garden Island. Retrieved July of 2013 from http://thegardenisland.com/news/local/hanalei-vs-hanalei/article_cf3329cc-0230-11e2-b214-0019bb2963f4.html

Bulletin of the Ecological Society of America. (2007). National tropical botanicalgarden to build Kauai's first "green" building, 88(2), 122. Retrieved July of 2013 from http://www.esajournals.org.proxy.lib.duke.edu/doi/pdf/10.1890/0012-9623%282007%2988%5B122%3ANTBGTB%5D2.0.CO%3B2

"Hanalei Bay watershed: Kaua'i, Hawaii". (2013). Retrieved in July of 2013 from http://www.epa.gov/Region09/water/watershed/measurew/hanalei/index.html#issues

"Hanalei Plantation Resort". (2012). Retrieved June of 2013 from http://hanaleiplantation.com/hpr/

United States Green Building Council. (2012). A local government guide: to LEED for Neighborhood Development, 1-34.

Hawaii Office of Planning, Coastal Zoning Management Program. (2006). Low impact development: A practitioner's guide. Retrieved July of 2013 from http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf

HOK. (2013). Fully Integrated Thinking [FIT]. Retrieved February of 2014 from http://www.hok.com/thought-leadership/fully-integrated-thinking/

Kauai Community Federal Credit Union (2012). LEED for New Construction 2.2 gold certificate. Retrieved July of 2013 from http://www.slideshare.net/corrin/hanalei-bay-watershed

Peck, S., & Kuhn, M. (n.d.). Design Guidelines for Green Roofs. Retrieved February of 2014 from http://www.cmhc-schl.gc.ca/en/inpr/bude/himu/coedar/upload/Design-Guidelines-for-Green-Roofs.pdf

"Project summary Hanalei Plantation Resort Hanalei, Island of Kawau'I Hawai'I". (2012). Retrieved March of 2103 from http://lauhala.com/hinano/20120608-072440-hanalei-plantation-resort-draft-proposal.pdf

Song, U., Kim, E., Bang J. H., Son, D. J. Waldman, B., & Lee, E. J. (2014). Wetlands are an effective green roof system. Building and Environment, 66(1), 141-147.